Identification of Plants with

FLESHY FRUITS

Eugene C. Ogden
Richard S. Mitchell

The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Albany, New York 12230

RANDOM ACCESS KEYS TO PLANTS WITH FLESHY FRUITS

Match the fruit color with length and number of seeds to determine the proper key.

FRUITS	Less than 1 cm long with 1 seed	Less than 1 cm long with more than 1 seed	More than 1 cm long with 1 seed	More than 1 cm long with more than 1 seed
WHITE or GRAY	KEY 1	KEY 2	KEY 3	KEY 4
BROWN or TAN	KEY 5	KEY 6	KEY 7	KEY 8
YELLOW	KEY 9	KEY 10	KEY 11	KEY 12
ORANGE	KEY 13	KEY 14	KEY 15	KEY 16
RED or PINK	KEY 17	KEY 18	KEY 19	KEY 20
BLUE	KEY 21	KEY 22	KEY 23	KEY 24
PURPLE	KEY 25	KEY 26	KEY 27	KEY 28
GREEN	KEY 29	KEY 30	KEY 31	KEY 32
BLACK	KEY 33	KEY 34	KEY 35	KEY 36

Identification of Plants with

FLESHY FRUITS

EUGENE C. OGDEN
State Botanist Emeritus
New York State Museum

RICHARD S. MITCHELL
State Botanist
New York State Museum

1990

Bulletin No. 467

New York State Museum

The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Albany, New York 12230

THE UNIVERSITY OF THE STATE OF NEW YORK

Regents of The University

MARTIN C. BARELL, *Chancellor*, B.A., I.A., LL.B.	Muttontown
R. CARLOS CARBALLADA, *Vice Chancellor*, B.S.	Rochester
WILLARD A. GENRICH, LL.B.	Buffalo
EMLYN I. GRIFFITH, A.B., J.D	Rome
JORGE L. BATISTA, B.A., J.D.	Bronx
LAURA BRADLEY CHODOS, B.A., M.A.	Vischer Ferry
LOUISE P. MATTEONI, B.A., M.A., Ph.D.	Bayside
J. EDWARD MEYER, B.A., LL.B.	Chappaqua
FLOYD S. LINTON, A.B., M.A., M.P.A.	Miller Place
MIMI LEVIN LIEBER, B.A., M.A.	Manhattan
SHIRLEY C. BROWN, B.A., M.A., Ph.D.	Albany
NORMA GLUCK, B.A., M.S.W.	Manhattan
JAMES W. MCCABE, SR., A.B., M.A.	Johnson City
ADELAIDE L. SANFORD, B.A., M.A., P.D.	Hollis
WALTER COOPER, B.A., Ph.D.	Rochester
GERALD J. LUSTIG, B.A., M.D.	Staten Island

President of The University and Commissioner of Education
THOMAS SOBOL

Executive Deputy Commissioner of Education
THOMAS E. SHELDON

Deputy Commissioner for Cultural Education
CAROLE F. HUXLEY

Assistant Commissioner for the State Museum
MARTIN E. SULLIVAN

Director, Research and Collections
PAUL J. SCUDIERE

Chief Scientist, Biological Survey
NORTON G. MILLER

ACKNOWLEDGMENTS

Everett Ogden, son of the senior author, provided extensive advice and assistance regarding computer techniques; he helped plan the random access keys, checked data using his own computer and supplied printouts at various stages of manuscript preparation in addition to preparing the computer disk and the technical appendices. Mary Beth Vought prepared the plates of drawings and cover illustrations. Stephen A. Spongberg of the Arnold Arboretum, Harvard University, reviewed the manuscript and suggested several important improvements. Clifford Lamere helped collect plants for study and helped test the keys.

CONTENTS

INTRODUCTION

Identification of fleshy fruits from plants found growing in the wild becomes especially important when one needs to know if the fruits are harmless or poisonous. This bulletin was written primarily for parents who want to know the names of fleshy-fruited wild plants that might tempt small children to taste them, but it is also intended for physicians and emergency room personnel, who often need to make quick determinations regarding potentially poisonous plants. Keys and illustrations provide a rapid method for reducing the likely identity of a fruit to a few possibilities that may then be checked in books on native and naturalized plants. The reader is referred to specific page numbers in the *AMA Handbook of Poisonous and Injurious Plants* in cases where the fruit identified is of medical interest. For those plants which are potentially harmful, but not covered by the AMA handbook, a caution from Hardin and Arena's *Human Poisoning from Native and Cultivated Plants* is cited. Information on these plants may be found elsewhere in the literature. Potential users of this guide should familiarize themselves with its use prior to an emergency situation if possible. This will help to avoid frustration in a crisis. Especially those people with small children may wish to identify in advance the plants in their vicinity that produce fleshy fruits and which might prove harmful if swallowed.

Characters in the keys have been kept simple, so that the user need not be a professional botanist to make swift and accurate identifications. Since the keys avoid highly technical characters, they may not always lead to a single genus, though they usually do. In a very few cases (depending on key choices and characters available) they eliminate all but two or three genera to be sought among the illustrations or found in popular books on wild plants. Two kinds of keys are offered to aid in identification: random access and sequential. If only the fruits are available it will be necessary to choose the proper random access key (inside the front cover or p. 6), but if stems and leaves are also present, the sequential key (p. 66) may be the key of choice. A random access key is also provided for easy plant identification using a personal computer (IBM PC, XT-AT compatible) on a 5 1/4 inch, 360K floppy disk, included in a packet inside the rear cover of this publication. Consult Appendix 1 for instructions.

Professional botanists who scrutinize the random access keys will note that certain characteristics are acknowledged for some plants that they technically do not have. Experience in testing the keys has shown that these characters are the ones most often wrongly chosen during the identification process. Accommodation for such common misinterpretations should in no way interfere with fruit identification by those persons applying the characters correctly. For example: some plants have only alternate leaves, but these may be tightly spiraled at branch tips and appear to be whorled. Such plants are included under both categories in the random access keys. In addition, some users may not easily distinguish between leaves and leaflets, so genera having alternate leaves with opposite leaflets are included under both alternate and opposite leaves. Fruits that remain green or yellow for long periods before developing the fully ripe color are included under each of the colors that they may exhibit when fleshy or soft-pulpy. In *Caulophyllum* (blue cohosh) the naked seeds are berrylike, as are the seeds of yews and fleshy cones of junipers, also treated in the keys. In strawberries and similar plants, the true fruits are seedlike, embedded in a swollen, red, flower receptacle. The whole unit is treated here as a fruit with embedded seeds. Thus, strict adherence to botanical exactness is occasionally sacrificed in favor of facility and speed of identification.

Opinions may vary as to whether some fruits are fleshy or merely pulpy. Some of those included here are somewhat pulpy before maturity but drier when mature. We have tried to include those that are sufficiently juicy or soft-pulpy to entice one to taste them. If fruits alone are available, and nothing is known about the plant that produced them, the use of random access keys should still be profitable in reducing the 128 kinds (genera) of plants treated here to a much smaller group.

The geographical area covered in this treatment is the northeastern United States and southern Canada to the western boundaries of Minnesota, Iowa and Missouri and the southern boundaries of Missouri, Kentucky and Virginia.

EXPLANATION OF CHARACTERS

Fruit color The colors used here most often refer to the surfaces of mature fruits, although in some cases maturity may be difficult to determine. Many fruits are green and remain so for a long period before becoming fully mature. During their early development most fruits are firm or perhaps pulpy, but scarcely fleshy, but some remain green and become fleshy at maturity. The colors of some immature fruits are included if young fruits are juicy or pulpy at that stage. If fruits or clusters of fruits exhibit more than one color, one may choose either or both, with the dominant color recommended. People see colors somewhat differently. If fruits appear to be blue but are not found in the blue key, try purple. Dark colors may appear black to some.

Fruit size One centimeter (cm) equals two-fifths (2/5) of an inch. A centimeter rule is printed inside the back cover for easy measurement. It is best to measure several fruits if possible. Since fruits are variable in size, avoid measuring the smallest or largest ones. Some fruits are composed of small, closely packed fruitlets (example: blackberry), and these are here considered to be a single fruit. In this publication, measurements of compound and multiple fruits always refer to the clusters rather than their subunits.

Floral remnants Withered parts of the flower may remain attached to the fruit near the tip (examples: blueberry, apple) or they may persist only at the base, where the fruit attaches to its stalk (tomato, cherry). Such persistent floral parts usually consist of dried sepals and/or stamens. In many fruits the persistence of floral parts is not easily determined, so some compensation is made for this in the keys. If in doubt, avoid using this character.

Seeds and pits Seeds may be tightly packed, enclosed in a hard, bony structure (the pit of cherry or peach) or more broadly distributed (tomato, cucumber). Because pits may simulate seeds, and the number of seeds within them is often difficult to determine, a pit is counted as a single seed in the keys.

Woody vs nonwoody Nonwoody (herbaceous) plants have soft stems that usually die back at the end of the growing season, in contrast to the hard, woody stems of trees and shrubs that persist over winter. Some plants are intermediate or are woody at their bases with herbaceous branches; they are here included in both categories.

Creeping or climbing Vinelike plants may be creeping (strawberry) or climbing (grape). Most plants neither creep nor climb, but some plants trail and might be mistaken for climbers. Some plants climb by means of tendrils, which are slender, twining appendages attached to the stem at some of the nodes.

Spines and thorns Sharp protrusions vary from stiff prickles to hard, woody thorns, and these may lead to quick plant identification when present; however, stems of most plants are spineless.

Leaves opposite, whorled, basal or alternate

The point at which a leaf attaches to a stem is called a node. There is a bud in the upper joint (axil) formed by the leaf base and stem. The bud may sometimes be small or hidden by the base of the leaf stalk (petiole). Opposite leaves are paired at the node, whereas whorled leaves are borne in threes or more. Alternate leaves occur one per node, but they may appear whorled if tightly spiraled (alternate-leaved plants may also have opposite or whorled, leaflike structures at the fruit bases). When leaves are not present at the same time as mature fruits, their former position may be determined by the positions of buds or the scars where leaves were attached. Basal leaves are often clustered, and it is sometimes difficult to determine whether their attachment is opposite or alternate.

Leaves simple or compound

Most leaves are simple. A simple leaf has a single, flat blade that may be unlobed, lobed or deeply dissected, but lacks discrete units cut all the way to the midvein. Leaves that are divided into distinct blades (leaflets) are said to be compound. A leaf, whether simple or compound, has a bud in its axil but a leaflet does not. Thus, one can usually determine whether a leaf is simple or compound by seeking the bud. Compensations are made in the keys for leaflets that are so much like simple leaves in appearance that they are very difficult to distinguish.

Leaves with or without teeth or lobes

Teeth (serrations and dentations) are projections from the margins of the blades of leaves or leaflets, usually with pointed tips, with a total length less than 1/8 the distance from their tip to the leaf's midvein. Lobes are similar but deeper (more than 1/8 that distance). Margins with or without teeth may also be lobed or unlobed.

Leaves petioled, sessile or peltate

Sessile leaves have no stalk (petiole); the blade is attached directly to the stem. Most leaves have a petiole, which may be short to very long. The petiole is nearly always attached to the blade at its lower margin, but in peltate leaves it is attached to the lower surface.

Note: For some genera in the random access keys all characters assigned to them do not exactly match the tabular data for computers. For example: *Cornus* species may have red or blue fruits and opposite or alternate leaves, but the single alternate-leaved *Cornus* does not have red fruits. Thus red fruit-color does not appear as an alternative character for it. Apparent contradictions in the numbering series of the random access keys also deserve explanation. If, for instance, numbers 2-9 are listed as shrubby, but 3 and 5 appear in the listing for vines, it means that those genera can be either shrubs or vines.

USING THE RANDOM ACCESS KEYS

If you plan to use the computer key from the disk provided, refer directly to Appendix 1 (p. 82) for instructions. If you are using the written keys, refer first to the chart on the inside, front cover (or on page 6) and determine the following three characters of the fruit to be identified: color, size and number of seeds. The chart will indicate one of the 36 random access keys to be consulted. Since fruits often vary in size and color, correct identifications may sometimes be made by using any one of several keys. Look down the whole list of choices and pick *any* character that agrees with the specimen, giving strong preference to any obvious character with a short list of numbers after it.

Method 1 - Jot down the list of numbers that follows the first choice. Each number corresponds to the name of a plant genus whose fruits have that trait.

Method 2 - Circle the list of numbers that follows the first choice on a prepared sheet of numbers. We find it easier and faster to use a page of prepared numbers. Page 97 provides sets of numbers from one to 128 representing the genera of fleshy-fruited plants. You may wish to use a Xerographic copying machine to make several copies of page 97 to use with the keys. This will allow you to circle and cross out numbers without writing in the book. Once your first key choice has been made, you will have written (method 1) or circled (method 2) a list of numbers with which to work. Choose another character that applies to your specimen and cross off any numbers that do not appear after your new choice. Continue in this way until only one or a few numbers remain. Refer to the list of plant names at the end of the key to find the genus name(s) to which the remaining number or numbers apply. Then consult the illustrations (appearing in numerical/alphabetical order), beginning on p. 50. Common names are listed under Genera of Plants with Fleshy Fruits (p. 77).

Fruits sometimes vary in features such as size, color, etc., and while most of these variations have been anticipated, there may be exceptions. If key characters fail to lead to a plant resembling the specimen in question, one may start over, checking to be sure the right random access key is used, or go to the sequential key. When several characters are available, delay using those about which there is some doubt until the obvious characters are depleted. If a plant exhibits two features listed as contrasting pairs in the key, both may be chosen (e.g. both lobed and unlobed leaves). One possible reason for failure to identify a fruit is that it came from a cultivated plant that does not occur in the wild, and is not covered by this bulletin.

Standardized, international, scientific names are used in the keys to avoid confusion. Most genera have several common names and some common names refer to more than one genus. Although common names are useful, care must be taken to refer to the scientific or Latin names when looking up plants in botanical publications. The name sumac, for instance, is used for both *Rhus* (harmless) and *Toxicodendron* (causing toxic skin irritation). Many books use *Rhus* to include both the harmless and poisonous species. The name huckleberry refers to *Gaylussacia* in some regions and to *Vaccinium* in others. The term cranberry is used for some species of *Vaccinium* and also for *Viburnum*, which are not even closely related. The elderberry genus (*Sambucus)* includes certain species with edible fruits and others reported to be poisonous.

For more detailed descriptions and information about possible harmful effects, we encourage the use of publications listed under "suggested references" (p. 80). This bulletin is intended to serve as a means of quick determination of fruit identities, and should be considered only a starting point from which to locate more complete information and reference sources.

RANDOM ACCESS KEYS TO PLANTS WITH FLESHY FRUITS

Match the fruit color with length and number of seeds to determine the proper key.

FRUITS	Less than 1 cm long with 1 seed	Less than 1 cm long with more than 1 seed	More than 1 cm long with 1 seed	More than 1 cm long with more than 1 seed
WHITE or GRAY	KEY 1	KEY 2	KEY 3	KEY 4
BROWN or TAN	KEY 5	KEY 6	KEY 7	KEY 8
YELLOW	KEY 9	KEY 10	KEY 11	KEY 12
ORANGE	KEY 13	KEY 14	KEY 15	KEY 16
RED or PINK	KEY 17	KEY 18	KEY 19	KEY 20
BLUE	KEY 21	KEY 22	KEY 23	KEY 24
PURPLE	KEY 25	KEY 26	KEY 27	KEY 28
GREEN	KEY 29	KEY 30	KEY 31	KEY 32
BLACK	KEY 33	KEY 34	KEY 35	KEY 36

KEY 1 White or light gray fruits less than 1 cm long with 1 seed

FRUITS Covered with thick, pale wax: 79
Not covered with wax: 6 34 47 64 94 122

With minute, silvery scales: 47
Without silvery scales: 6 34 64 79 94 122

PLANTS Creeping or climbing: 64 122
Not creeping or climbing: 6 34 47 64 79 94 122

Growing on tree branches: 6 94
Not growing on tree branches: 34 47 64 79 122

LEAVES Less than 0.5 cm wide: 6 64
More than 0.5 cm wide: 34 47 79 94 122

Opposite or whorled: 6 34 64 94 122
Alternate: 47 79 122

Simple: 6 34 47 64 79 94
Compound: 122

Densely scaly on under surface: 47
Not densely scaly: 6 34 64 79 94 122

With teeth: 79 122
Without teeth: 6 34 47 64 79 94 122

6 Arceuthobium
34 Cornus
47 Elaeagnus
64 Juniperus
79 Myrica
94 Phoradendron (AMA p. 131)
122 Toxicodendron (POISONOUS TO TOUCH! AMA pp. 188, 199)

KEY 2 White or light gray fruits less than 1 cm long with more than 1 seed

FRUITS Dense cluster of fruitlets resembling a blackberry: 78
Not resembling a blackberry: 1 31 34 48 49 56 64 77 110 119

With floral remnants at apex: 1 31 34 56 64 77 78 110 119
Without floral remnants at apex: 1 31 48 49 64 78

With 2 seeds: 34 64 119
With 3-10 seeds: 1 31 48 56 64 77 110
With more than 10 seeds: 1 31 49 56 78

PLANTS Woody: 34 48 49 56 64 78 110 119
Not woody: 1 31 56 77

Creeping: 48 49 56 64 77
Not creeping: 1 31 34 48 64 78 110 119

LEAVES Less than 1 cm long: 48 56 64
More than 1 cm long: 1 31 34 49 64 77 78 110 119

Less than 0.5 cm wide: 48 56 64
More than 0.5 cm wide: 1 31 34 48 49 56 77 78 110 119

Opposite: 1 34 64 77 110 119
Whorled or basal: 31 64
Alternate: 1 48 49 56 78

Simple: 31 34 48 49 56 64 77 78 119
Compound: 1 110

Lobed: 1 78
Not lobed: 1 31 34 48 49 56 64 77 78 110 119

With teeth: 1 78 110 119
Without teeth: 31 34 48 49 56 64 77 119

1 Actaea (AMA p. 21)
31 Clintonia (H&A p. 154)
34 Cornus
48 Empetrum
49 Epigaea
56 Gaultheria
64 Juniperus
77 Mitchella
78 Morus
110 Sambucus (AMA p. 147)
119 Symphoricarpos (AMA p. 165)

KEY 3 White or light gray fruits more than 1 cm long with 1 seed

FRUITS With silvery scales: 47
Without silvery scales: 64 122

PLANTS Creeping or climbing: 64 122
Not creeping or climbing: 47 64 122

LEAVES Less than 0.5 cm wide: 64
More than 0.5 cm wide: 47 122

Opposite or whorled: 64 122
Alternate: 47 122

Simple: 47 64
Compound: 122

Densely scaly on under surface: 47
Not densely scaly: 64 122

47 Elaeagnus
64 Juniperus
122 Toxicodendron (POISONOUS TO TOUCH! AMA pp. 188, 199)

KEY 4 White or light gray fruits more than 1 cm long with more than 1 seed

FRUITS
Dense cluster of fruitlets resembling a blackberry: 78
Not resembling a blackberry: 1 31 64 98 123

With 2-10 seeds: 1 31 64 123
With more than 10 seeds: 1 31 78 98 123

PLANTS
Woody: 64 78
Not woody: 1 31 98 123

Creeping: 64
Not creeping: 1 31 64 78 98 123

LEAVES
Less than 0.5 cm wide: 64
More than 1 cm wide: 1 31 78 98 123

Opposite: 1 64 98
Whorled: 64 123
Basal: 31
Alternate: 1 78

Simple: 31 64 78 98 123
Compound: 1

Lobed: 1 78
Not lobed: 1 31 64 78 98 123

With teeth: 1 78 98
Without teeth: 31 64 123

1 Actaea (AMA p. 21)
31 Clintonia (H&A p. 154)
64 Juniperus
78 Morus
98 Podophyllum (AMA pp. 6, 136)
123 Trillium

KEY 5 Brown or tan fruits less than 1 cm long with 1 seed

FRUITS With many fleshy projections: 97
Without fleshy projections: 26 36 52 91 106 128

Asymmetrical, strongly curved: 36
Nearly symmetrical, not strongly curved: 26 52 91 97 106 128

PLANTS Woody: 26 36 97 106 128
Not woody: 52 91

Creeping or climbing: 52
Not creeping or climbing: 26 36 52 91 97 106 128

With spines: 128
Without spines: 26 36 52 91 97 106

LEAVES Opposite: 52 106 128
Whorled or basal: 91
Alternate: 26 36 52 97 106 128

Simple: 26 36 52 91 97
Compound: 52 106 128

With teeth: 26 97 106 128
Without teeth: 26 36 52 91 106 128

26 Celtis
36 Cotinus (AMA p. 199)
52 Floerkea
91 Peltandra
97 Planera
106 Rhus
128 Zanthoxylum

KEY 6 Brown or tan fruits less than 1 cm long with more than 1 seed

FRUITS With floral remnants at apex: 91 108
Without floral remnants at apex: 50 91 128

With 2 seeds: 91 128
With more than 2 seeds: 50 91 108

PLANTS Woody: 50 108 128
Not woody: 91

With spines: 108 128
Without spines: 50 91 108

LEAVES Opposite: 50 108 128
Whorled or basal: 91
Alternate: 108 128

Simple: 50 91
Compound: 108 128

With teeth: 50 108 128
Without teeth: 91 128

50 Euonymus (AMA p. 79)
91 Peltandra
108 Rosa (AMA p. 194)
128 Zanthoxylum

KEY 7 Brown or tan fruits more than 1 cm long with 1 seed

FRUITS Less than 2 cm long: 26 74 91 103
2-5 cm long: 11 63 103
More than 5 cm long: 11

With floral remnants at apex: 26 103
Without floral remnants at apex: 11 26 63 74 91

PLANTS Woody: 11 26 63 74 103
Not woody: 91

LEAVES Opposite: 63 74
Whorled or basal: 91
Alternate: 11 26 63 74 103

Simple: 11 26 91 103
Compound: 63 74

With teeth: 26 63 74
Without teeth: 11 26 91 103

11 Asimina (AMA p. 192)
26 Celtis
63 Juglans (AMA p. 193))
74 Melia (AMA p. 115)
91 Peltandra
103 Pyrularia (H&A p. 158)

KEY 8 Brown or tan fruits more than 1 cm long with more than 1 seed

FRUITS

Less than 2 cm long: 10 50 51 60 83 91 108 123
2-3 cm long: 41 51 83 120 123
More than 3 cm long: 11 22 41 51 72 83 86 120 123

With floral remnants at apex: 10 22 51 60 83 86 91 108 120
Without floral remnants at apex: 11 41 50 72 83 91 120 123

With 2-10 seeds: 10 11 22 41 50 60 91 123
With more than 10 seeds: 10 22 51 60 72 83 86 108 120 123

PLANTS

Woody: 11 22 41 50 51 72 108
Not woody: 10 60 83 86 91 120 123

With spines: 86 108
Without spines: 10 11 22 41 50 51 60 72 83 86 91 108 120 123

Growing in water: 83 91
Not growing in water: 10 11 22 41 50 51 60 72 86 91 108 120 123

With a skunklike odor: 120
Without skunklike odor: 10 11 22 41 50 51 60 72 83 86 91 108 123

LEAVES

Blades less than 15 cm long: 10 22 41 50 51 60 72 83 108 120 123
Blades more than 15 cm long: 11 51 72 83 91 108 120

Opposite: 22 50 108
Whorled: 123
Basal: 10 60 83 91 120
Alternate: 11 41 51 72 108

Lobed: 10 51 60 72 83 91 120
Not lobed: 10 11 22 41 50 60 72 83 91 108 120 123

10 Asarum
11 Asimina (AMA p. 192)
22 Calycanthus (AMA p. 47)
41 Diospyros
50 Euonymus (AMA p. 79)
51 Ficus (AMA p. 198)
60 Hexastylis
72 Magnolia (AMA p. 194)
83 Nymphaea
86 Opuntia (AMA pp. 185, 196)
91 Peltandra
108 Rosa (AMA p. 194)
120 Symplocarpus (AMA p. 166)
123 Trillium

KEY 9 Yellow fruits less than 1 cm long with 1 seed

FRUITS With silvery scales: 47 113
Without silvery scales: 8 15 38 52 67 101 113 122 126

With floral remnants at apex: 8 15 38 47 52 113 122 126
Without floral remnants at apex: 8 15 47 52 67 101 113 122

PLANTS Woody: 15 38 47 67 101 113 122 126
Not woody: 8 52 122

Creeping or climbing: 52 122
Not creeping or climbing: 8 15 38 47 52 67 101 113 122 126

With spines: 15 38 101 113
Without spines: 8 47 52 67 101 113 122 126

LEAVES Opposite: 8 52 113 122 126
Alternate: 8 15 38 47 52 67 101 122

Simple: 15 38 47 52 67 101 113 126
Compound: 8 52 122

Less than 5 per plant: 8 52
More than 5 per plant: 15 38 47 52 67 101 113 122 126

Under surface covered with silvery or brownish scales: 47 113
Without silvery or brownish scales: 8 15 38 52 67 101 122 126

Lobed: 8 38 52 122 126
Not lobed: 8 15 38 47 52 67 101 113 122 126

With teeth: 15 38 101 122 126
Without teeth: 8 15 47 52 67 113 122 126

8 Arisaema (AMA p. 33)
15 Berberis
38 Crataegus
47 Elaeagnus
52 Floerkea
67 Lindera
101 Prunus (AMA p. 138)
113 Shepherdia
122 Toxicodendron (POISONOUS TO TOUCH! AMA pp. 188, 199)
126 Viburnum

KEY 10 Yellow fruits less than 1 cm long with more than 1 seed

FRUITS Enclosed in a papery husk: 65 95 116
Not enclosed in a husk: 8 15 25 38 44 62 68 80 88 107 108 110 116 124 125

With floral remnants at apex: 8 15 25 38 68 88 107 108 110 124 125
Without floral remnants at apex: 8 15 25 44 62 65 68 80 88 95 116

With 2-10 seeds: 8 15 25 38 44 62 68 80 88 110 124
With more than 10 seeds: 65 95 107 108 116 125

PLANTS Woody: 15 25 38 62 68 80 107 108 110 125
Not woody: 8 44 65 88 95 116 124

Creeping or climbing: 25 68 108
Not creeping or climbing: 8 15 38 44 62 65 68 80 88 95 107 108 110 116 124 125

With spines: 15 25 38 107 108 116
Without spines: 8 25 44 62 65 68 80 88 95 107 108 110 116 124 125

LEAVES Opposite: 8 68 95 108 110 124
Whorled: 8 15 88 107
Alternate: 8 15 25 38 44 62 65 80 95 107 108 116 125

Simple: 15 25 38 44 62 65 68 80 95 107 116 124 125
Compound: 8 88 108 110

Lobed: 8 38 62 95 107 116 124
Not lobed: 8 15 25 38 44 62 65 68 80 88 95 108 110 116 124 125

With teeth: 15 25 38 62 80 88 95 107 108 110 116 125
Without teeth: 8 15 44 62 65 68 80 95 116 124 125

8 Arisaema (AMA p. 33)
15 Berberis
25 Celastrus (AMA p. 53)
38 Crataegus
44 Disporum
62 Ilex (AMA pp. 6, 97)
65 Leucophysalis (see *Physalis* (AMA p. 132)
68 Lonicera (AMA p. 109)
80 Nemopanthus
88 Panax
95 Physalis (AMA p. 132)
107 Ribes
108 Rosa (AMA p. 194)
110 Sambucus (AMA p. 147)
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
124 Triosteum
125 Vaccinium

KEY 11 Yellow fruits more than 1 cm long with 1 seed

FRUITS Less than 2 cm long: 8 15 18 38 47 74 81 101 103 111 122 126
More than 2 cm long: 11 101 103

About as long as wide: 8 38 47 74 101 103 111 122 126
Longer than wide: 11 15 18 47 81 103

With silvery scales: 47
Without silvery scales: 8 11 15 18 38 74 81 101 103 111 122 126

With floral remnants at apex: 8 15 18 38 47 81 103 122 126
Without floral remnants at apex: 8 11 15 47 74 101 111 122

PLANTS Woody: 11 15 18 38 47 74 81 101 103 111 122 126
Not woody: 8 122

Creeping or climbing: 122
Not creeping or climbing: 8 11 15 18 38 47 74 81 101 103 111 122 126

With spines: 15 38 101
Without spines: 8 11 18 47 74 81 101 103 111 122 126

LEAVES Opposite: 8 18 74 81 111 122 126
Alternate: 8 11 15 38 47 74 101 103 111 122

Simple: 11 15 18 38 47 81 101 103 126
Once compound: 8 111 122
Twice compound: 74

Lobed: 8 38 122 126
Not lobed: 8 11 15 18 38 47 74 81 101 103 111 122 126

With teeth: 15 38 74 101 122 126
Without teeth: 8 11 15 18 47 81 103 111 122 126

8 Arisaema (AMA p. 33)
11 Asimina (AMA p. 192)
15 Berberis
18 Buckleya
38 Crataegus
47 Elaeagnus
74 Melia (AMA p. 115)
81 Nestronia
101 Prunus (AMA p. 138)
103 Pyrularia (H&A p. 158)
111 Sapindus (H&A p. 158)
122 Toxicodendron (POISONOUS TO TOUCH! AMA pp. 188, 199)
126 Viburnum

KEY 12 Yellow fruits more than 1 cm long with more than 1 seed

FRUITS

Less than 2 cm long: 8 15 25 38 44 51 65 68 82 88 90 95 98 104 107 108 109 116 125

More than 2 cm long: 2 11 22 27 39 41 51 70 82 90 95 98 104 108 109 120

Dense cluster of fruitlets resembling a blackberry: 109

Not resembling a blackberry: 2 8 11 15 22 25 27 38 39 41 44 51 65 68 70 82 88 90 95 98 104 107 108 116 120 125

Enclosed in a papery husk: 65 82 95 116

Not enclosed in a husk: 2 8 11 15 22 25 27 38 39 41 44 51 68 70 88 90 98 104 107 108 109 116 120 125

With floral remnants at apex: 8 15 22 25 27 38 39 51 68 88 98 104 107 108 120 125

Without floral remnants at apex: 2 8 11 15 25 41 44 65 68 70 82 88 90 95 98 109 116 120

With 2-10 seeds: 2 8 11 15 22 25 38 41 44 68 88 104 109

With more than 10 seeds: 22 27 39 51 65 70 82 90 95 98 107 108 109 116 120 125

PLANTS

Woody: 2 11 15 22 25 27 38 39 41 51 68 70 90 104 107 108 109 125

Not woody: 8 44 65 82 88 90 95 98 109 116 120

Creeping or climbing: 2 25 68 90 108

Not creeping or climbing: 8 11 15 22 27 38 39 41 44 51 65 68 70 82 88 95 98 104 107 108 109 116 120 125

With spines: 8 15 25 27 38 70 104 107 108 116

Without spines: 2 8 11 22 25 27 39 41 44 51 65 68 82 88 90 95 98 104 107 108 109 116 120 125

LEAVES

Opposite: 8 22 68 95 98 108

Whorled or basal: 2 8 15 88 107 120

Alternate: 2 8 11 15 22 25 27 38 39 41 44 51 65 68 70 82 90 95 104 107 108 109 116 125

Simple: 11 15 22 25 27 38 39 41 44 51 65 68 70 82 90 95 98 104 107 109 116 120 125

Compound: 2 8 88 108

Peltate: 98

Not peltate: 2 8 11 15 22 25 27 38 39 41 44 51 65 68 70 82 88 90 95 98 104 107 108 109 116 120 125

Lobed: 8 38 51 82 90 95 98 104 107 109 116

Not lobed: 2 8 11 15 22 25 27 38 39 41 44 65 68 70 82 88 95 104 108 116 120 125

With teeth: 15 25 27 38 39 82 88 90 95 98 104 107 108 109 116 125

Without teeth: 2 8 11 15 22 41 44 51 65 68 70 90 95 116 120 125

2 Akebia
8 Arisaema (AMA p. 33)
11 Asimina (AMA p. 192)
15 Berberis
22 Calycanthus (AMA p. 47)
25 Celastrus (AMA p. 53)
27 Chaenomeles
38 Crataegus
39 Cydonia
41 Diospyros
44 Disporum
51 Ficus (AMA p. 198)
65 Leucophysalis (see *Physalis*, AMA p. 132),
68 Lonicera (AMA p. 109)
70 Maclura (AMA p. 194)
82 Nicandra (H&A p. 140)
88 Panax
90 Passiflora
95 Physalis (AMA p. 132)
98 Podophyllum (AMA pp. 6, 136)
104 Pyrus
107 Ribes
108 Rosa (AMA p. 194)
109 Rubus
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
120 Symplocarpus (AMA p. 166)
125 Vaccinium

KEY 13 Orange fruits less than 1 cm long with 1 seed

FRUITS With floral remnants at apex: 8 26 34 38 126
Without floral remnants at apex: 8 26 33

PLANTS Woody: 26 34 38 126
Not woody: 8 33 34

With spines: 38
Without spines: 8 26 33 34 126

LEAVES Opposite: 8 33 34 126
Whorled or basal: 8 33 34
Alternate: 8 26 33 38

Simple: 26 33 34 38 126
Compound: 8

With teeth: 26 38 126
Without teeth: 8 26 33 34 126

8 Arisaema (AMA p. 33)
26 Celtis
33 Convallaria (AMA pp. 6, 62)
34 Cornus
38 Crataegus
126 Viburnum

KEY 14 Orange fruits less than 1 cm long with more than 1 seed

FRUITS Enclosed in a papery husk: 95 116
Not enclosed in a husk: 8 25 33 34 38 44 50 68 102 107 108 110 116 117 124

With floral remnants at apex: 8 25 34 38 68 102 107 108 110 117 124
Without floral remnants at apex: 8 25 33 44 50 68 95 116

With 2 seeds: 8 25 33 34
With 3-10 seeds: 25 33 38 44 50 68 102 110 117 124
With more than 10 seeds: 50 95 107 108 116

PLANTS Woody: 25 38 50 68 102 107 108 110 117
Not woody: 8 33 34 44 95 116 124

Creeping or climbing: 25 50 68 102 108
Not creeping or climbing: 8 33 34 38 44 50 68 95 102 107 108 110 116 117 124

With spines: 25 38 102 107 108 116
Without spines: 8 25 33 34 44 50 68 95 102 107 108 110 116 117 124

LEAVES Opposite: 8 33 34 50 68 95 108 110 117 124
Whorled or basal: 8 33 34 102 107
Alternate: 8 25 33 38 44 95 102 107 108 116 117

Simple: 25 33 34 38 44 50 68 95 102 107 116 124
Compound: 8 108 110 117

Attached at less than 5 nodes: 8 33 34 44 95
Attached at more than 5 nodes: 25 38 44 50 68 95 102 107 108 110 116 117 124

Lobed: 8 38 95 102 107 116 124
Not lobed: 8 25 33 34 38 44 50 68 95 102 108 110 116 117 124

With teeth: 25 38 50 95 102 107 108 110 116 117
Without teeth: 8 33 34 44 68 95 116 124

8 Arisaema (AMA p. 33)
25 Celastrus (AMA p. 53)
33 Convallaria (AMA pp. 6, 62)
34 Cornus
38 Crataegus
44 **Disporum**
50 Euonymus (AMA p. 79)
68 Lonicera (AMA p. 109)
95 Physalis (AMA p. 132)
102 Pyracantha
107 Ribes
108 Rosa (AMA p. 194)
110 Sambucus (AMA p. 147)
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
117 Sorbus
124 Triosteum

KEY 15 Orange fruits more than 1 cm long with 1 seed

FRUITS With floral remnants at apex: 8 26 34 38 126
Without floral remnants at apex: 8 26

PLANTS Woody: 26 34 38 126
Not woody: 8 34

With spines: 38
Without spines: 8 26 34 126

LEAVES Opposite: 8 34 126
Whorled or basal: 8 34
Alternate: 8 26 38

Simple: 26 34 38 126
Compound: 8

With teeth: 26 38 126
Without teeth: 8 26 34 126

8 Arisaema (AMA p. 33)
26 Celtis
34 Cornus
38 Crataegus
126 Viburnum

KEY 16 Orange fruits more than 1 cm long with more than 1 seed

FRUITS

1-2 cm long: 8 17 25 33 34 38 41 44 50 68 69 95 107 108 109 116 117 123
2-5 cm long: 17 41 95 108 120 123
More than 5 cm long: 70

A compact group of fruitlets: 8 17 34 109 120
Not a compact group of fruitlets: 8 25 33 34 38 41 44 50 68 69 70 95 107 108 116 117 123

Enclosed in a papery husk: 95 116
Not enclosed in a husk: 8 17 25 33 34 38 41 44 50 68 69 70 107 108 109 116 117 120 123

With floral remnants at apex: 8 25 34 38 68 107 108 117 120
Without floral remnants at apex: 8 17 25 33 41 44 50 68 69 70 95 109 116 120 123

With 2-10 seeds: 8 25 33 34 38 41 44 50 68 109 117 123
With more than 10 seeds: 17 50 69 70 95 107 108 109 116 120 123

PLANTS

Woody: 17 25 34 38 41 50 68 69 70 107 108 109 117
Not woody: 8 33 34 44 95 109 116 120 123

Creeping or climbing: 25 50 68 69 108
Not creeping or climbing: 8 17 33 34 38 41 44 50 68 69 70 95 107 108 109 116 117 120 123

With spines: 25 38 69 70 107 108 109 116
Without spines: 8 17 25 33 34 41 44 50 68 69 70 95 108 109 116 117 120 123

LEAVES

Opposite: 8 17 33 34 50 68 95 108 117
Whorled: 8 17 34 69 107 123
Basal: 33 120
Alternate: 8 17 25 33 38 41 44 69 70 95 107 108 109 116 117

Simple: 17 25 33 34 38 41 44 50 68 69 70 95 107 109 116 120 123
Compound with 3 leaflets: 8 108 109
Compound with more than 3 leaflets: 8 108 109 117

Less than 5 per plant: 8 33 44 109 120 123
More than 5 per plant: 17 25 34 38 41 44 50 68 69 70 95 107 108 109 116 117

Lobed: 8 17 38 95 107 109 116
Not lobed: 8 17 25 33 34 38 41 44 50 68 69 70 95 108 109 116 117 120 123

With teeth: 17 25 38 50 95 107 108 109 116 117
Without teeth: 8 33 34 41 44 68 69 70 95 116 120 123

8 Arisaema (AMA p. 33)
17 Broussonetia
25 Celastrus (AMA p. 53)
33 Convallaria (AMA pp. 6, 62)
34 Cornus
38 Crataegus
41 Diospyros
44 Disporum
50 Euonymus (AMA p. 79)
68 Lonicera (AMA p. 109)
69 Lycium (AMA p. 110)
70 Maclura (AMA p. 194)
95 Physalis (AMA p. 132)
107 Ribes
108 Rosa (AMA p. 194)
109 Rubus
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
117 Sorbus
120 Symplocarpus (AMA p. 166)
123 Trillium

KEY 17 Red or pink fruits less than 1 cm long with 1 seed

FRUITS

About as long as wide: 7 8 26 32 33 34 38 40 47 58 71 72 101 106 113 114 115 121 126 127 128
Longer than wide: 8 15 26 34 36 43 47 58 67 72 121 128

Asymmetrical, strongly curved: 36
Nearly symmetrical, not curved: 7 8 15 26 32 33 34 38 40 43 47 58 67 71 72 101 106 113 114 115 121 126 127 128

With stalks: 7 8 15 26 32 33 34 36 38 43 47 58 67 71 72 101 106 113 114 115 121 126 127 128
Without stalks: 8 34 40 106 121

With floral remnants at apex: 8 15 26 34 36 38 40 47 58 113 126
Without floral remnants at apex: 7 8 15 26 32 33 36 40 43 47 67 71 72 101 106 113 114 115 121 127 128

PLANTS

Woody: 7 15 26 32 34 36 38 40 43 47 67 72 101 106 113 115 121 126 127 128
Not woody: 8 33 34 58 71 114 115

Creeping: 7 121
Climbing: 32 115 127
Not creeping or climbing: 8 15 26 33 34 36 38 40 43 47 58 67 71 72 101 106 113 114 121 126 128

With tendrils: 115 127
Without tendrils: 7 8 15 26 32 33 34 36 38 40 43 47 58 67 71 72 101 106 113 114 121 126 128

With spines: 15 38 101 113 115 128
Without spines: 7 8 26 32 33 34 36 40 43 47 58 67 71 72 101 106 113 114 115 121 126 127

With spicy-aromatic odor when crushed: 67 106
Without spicy-aromatic odor: 7 8 15 26 32 33 34 36 38 40 43 47 58 71 72 101 106 113 114 115 121 126 127 128

LEAVES

Less than 0.5 cm wide: 121
More than 0.5 cm wide: 7 8 15 26 32 33 34 36 38 40 43 47 58 67 71 72 101 106 113 114 115 126 127 128

Opposite: 8 33 34 106 113 121 126 128
Whorled or basal: 8 15 33 34
Alternate: 7 8 15 26 32 33 36 38 40 43 47 58 67 71 72 101 106 114 115 121 127 128

Simple: 7 15 26 32 33 34 36 38 40 43 47 58 67 71 72 101 113 114 115 121 126 127
Compound: 8 106 128

With 1-3 per plant: 8 33 71
With more than 3 per plant: 7 8 15 26 32 34 36 38 40 43 47 58 67 72 101 106 113 114 115 121 126 127 128

Densely scaly on under surface: 47 113
Not densely scaly: 7 8 15 26 32 33 34 36 38 40 43 58 67 71 72 101 106 114 115 121 126 127 128

Lobed: 8 38 72 106 126 127
Not lobed: 7 8 15 26 32 33 34 36 38 40 43 47 58 67 71 72 101 106 113 114 115 121 126 127 128

With teeth: 7 15 26 38 101 106 126 127 128
Without teeth: 7 8 15 26 32 33 34 36 40 43 47 58 67 71 72 106 113 114 115 121 126 128

7 Arctostaphylos
8 Arisaema (AMA p. 33)
15 Berberis
26 Celtis
32 Cocculus
33 Convallaria (AMA pp. 6, 62)
34 Cornus
36 Cotinus (AMA p. 199)
38 Crataegus
40 Daphne (AMA p. 68)
43 Dirca (AMA pp. 74, 198)
47 Elaeagnus
58 Geocaulon (H&A p. 155, under *Comandra*)
67 Lindera
71 Maianthemum (H&A p. 156)
72 Magnolia (AMA p. 194)
101 Prunus (AMA p. 138)
106 Rhus
113 Shepherdia
114 Smilacina
115 Smilax (H&A p. 158)
121 Taxus (AMA p. 167)
126 Viburnum
127 Vitis
128 Zanthoxylum

KEY 18 Red or pink fruits less than 1 cm long with more than 1 seed

FRUITS

Dense cluster of fruitlets resembling a blackberry: 78 109
Not resembling a blackberry: 1 3 7 8 9 12 15 20 21 25 28 33 34 37 38 44 45 48 50 54 56 61 62 68 71 77 80 85 88 95 96 102 105 107 108 110 114 115 116 117 118 119 124 125 127 128

Enclosed in a husk: 95 116
Not enclosed in a husk: 1 3 7 8 9 12 15 20 21 25 28 33 34 37 38 44 45 48 50 54 56 61 62 68 71 77 78 80 85 88 96 102 105 107 108 109 110 114 115 116 117 118 119 124 125 127 128

With a stalk: 1 3 7 8 9 12 15 20 21 25 33 34 37 38 44 45 50 54 56 61 62 68 71 77 78 80 85 88 95 96 102 105 107 108 109 110 114 115 116 117 118 119 124 125 127 128
Without a stalk: 8 20 21 28 34 48 85 119

With 1 fruit or 1 compact cluster per plant: 8 20 34 44 61 88 109
With more than 1 per plant: 1 3 7 8 9 12 15 21 25 28 33 34 37 38 44 45 48 50 54 56 62 68 71 77 78 80 85 88 95 96 102 105 107 108 109 110 114 115 116 117 118 119 124 125 127 128

With wintergreen odor: 56
Without wintergreen odor: 1 3 7 8 9 12 15 20 21 25 28 33 34 37 38 44 45 48 50 54 61 62 68 71 77 78 80 85 88 95 96 102 105 107 108 109 110 114 115 116 117 118 119 124 125 127 128

With floral remnants at apex: 1 3 8 9 15 20 25 28 34 37 38 56 68 77 78 85 88 96 102 107 108 110 117 119 124 125
Without floral remnants at apex: 1 7 8 12 15 20 21 25 28 33 44 45 48 50 54 61 62 68 71 78 80 88 95 96 105 109 114 115 116 118 127 128

With 2 seeds: 8 15 25 33 34 37 71 85 88 105 114 115 119 127 128
With 3-10 seeds: 1 3 7 8 9 12 15 20 21 25 33 34 37 38 44 48 50 56 61 62 68 77 80 88 96 102 105 109 110 115 116 117 124 127
With more than 10 seeds: 1 28 45 50 54 56 61 78 95 96 107 108 109 116 118 125

PLANTS

Woody: 3 7 9 15 21 25 34 37 38 48 50 56 62 68 78 80 85 102 105 107 108 109 110 115 116 117 119 125 127 128
Not woody: 1 8 12 20 28 33 34 44 45 54 56 61 71 77 88 95 96 109 114 115 116 117 118 124

Creeping or climbing: 7 25 37 45 48 50 54 56 68 77 102 107 108 109 115 116 125 127
Not creeping or climbing: 1 3 8 9 12 15 20 21 28 33 34 37 38 44 45 50 54 56 61 62 68 71 78 80 85 88 95 96 102 105 107 108 109 110 114 116 117 118 119 124 125 128

With tendrils: 115 127
Without tendrils: 1 3 7 8 9 12 15 20 21 25 28 33 34 37 38 44 45 48 50 54 56 61 62 68 71 77 78 80 85 88 95 96 102 105 107 108 109 110 114 116 117 118 119 124 125 128

With spines: 15 25 37 38 85 102 107 108 109 115 116 128
Without spines: 1 3 7 8 9 12 20 21 25 28 33 34 44 45 48 50 54 56 61 62 68 71 77 78 80 88 95 96 102 105 107 108 109 110 114 115 116 117 118 119 124 125 127

LEAVES

Opposite: 1 8 21 33 34 45 50 54 68 77 95 108 109 110 116 117 119 124 128
Whorled: 8 12 15 33 34 45 54 88 102 107
Basal: 20 33 45 54 61
Alternate: 1 3 7 8 9 15 25 28 33 37 38 44 45 48 56 61 62 71 78 80 85 95 96 102 105 107 108 109 114 115 116 117 118 125 127 128

Simple: 3 7 9 12 15 20 21 25 28 33 34 37 38 44 48 50 56 61 62 68 71 77 78 80 85 95 96 102 105 107 109 114 115 116 118 119 124 125 127
Compound with 3 leaflets: 8 45 54 88 108 109 116
Compound with 4-10 leaflets: 1 8 88 108 109 110 116 128
Compound with more than 10 leaflets: 1 8 108 110 117 128

1-3 per plant: 8 20 33 54 61 71 88 109
More than 3 per plant: 1 3 7 8 9 12 15 21 25 28 34 37 38 44 45 48 50 54 56 61 62 68 77 78 80 85 88 95 96 102 105 107 108 109 110 114 115 116 117 118 119 124 125 127 128

With stalks (petioles): 1 3 7 8 9 15 20 21 25 28 33 34 37 38 45 50 54 56 61 62 68 77 78 80 85 88 95 96 102 105 107 108 109 110 115 116 117 119 124 125 127 128
Without stalks: 7 8 12 15 33 34 44 45 48 50 54 56 61 68 71 88 95 108 109 110 114 115 116 117 118 124 125 128

With spines: 85 109
Without spines: 1 3 7 8 9 12 15 20 21 25 28 33 34 37 38 44 45 48 50 54 56 61 62 68 71 77 78 80 88 95 96 102 105 107 108 109 110 114 115 116 117 118 119 124 125 127 128

Lobed: 1 8 20 28 38 54 61 62 78 85 95 102 107 109 116 124 127
Not lobed: 1 3 7 8 9 12 15 20 21 25 28 33 34 37 38 44 45 48 50 54 56 62 68 71 77 78 80 88 95 96 102 105 108 109 110 114 115 116 117 118 119 124 125 127 128

With teeth: 1 3 9 15 21 25 28 38 45 50 54 56 61 62 78 80 85 88 95 102 105 107 108 109 110 116 117 119 125 127 128
Without teeth: 7 8 12 15 20 28 33 34 37 44 48 56 62 68 71 77 80 95 96 105 114 115 116 118 119 124 125 128

1 Actaea (AMA p. 21)
3 Amelanchier
7 Arctostaphylos
8 Arisaema (AMA p. 33)
9 Aronia
12 Asparagus
15 Berberis
20 Calla (AMA pp. 43, 197)
21 Callicarpa
25 Celastrus (AMA p. 53)
28 Chenopodium
33 Convallaria (AMA pp. 6, 62)
34 Cornus
37 Cotoneaster
38 Crataegus
44 Disporum
45 Duchesnia
48 Empetrum
50 Euonymus (AMA p. 79)
54 Fragaria
56 Gaultheria
61 Hydrastis
62 Ilex (AMA pp. 6, 97)
68 Lonicera (AMA p. 109)
71 Maianthemum (H&A p. 156)
77 Mitchella
78 Morus
80 Nemopanthus
85 Oplopanax
88 Panax
95 Physalis (AMA p. 132)
96 Phytolacca (AMA pp. 6, 133)
102 Pyracantha
105 Rhamnus (AMA p. 140)
107 Ribes
108 Rosa (AMA p. 194)
109 Rubus
110 Sambucus (AMA p. 147)
114 Smilacina
115 Smilax (H&A p. 158)
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
117 Sorbus
118 Streptopus (H&A p. 158)
119 Symphoricarpos (AMA p. 165)
124 Triosteum
125 Vaccinium
127 Vitis
128 Zanthoxylum

KEY 19 Red or pink fruits more than 1 cm long with 1 seed

FRUITS 1-2 cm long: 8 15 26 34 38 40 47 72 101 126 127
More than 2 cm long: 127

About as long as wide: 8 26 34 38 40 47 72 101 126 127
Longer than wide: 15 26 34 47 72 101

With stalks (pedicels): 8 15 26 34 38 47 72 101 126 127
Without stalks: 8 34 40

With floral remnants at apex: 8 15 26 34 38 40 47 126
Without floral remnants at apex: 8 15 26 40 47 72 101 127

PLANTS Woody: 15 26 34 38 40 47 72 101 126 127
Not woody: 8 34

Creeping or climbing: 127
Not creeping or climbing: 8 15 26 34 38 40 47 72 101 126

With spines: 15 38 101
Without spines: 8 26 34 40 47 72 101 126 127

LEAVES Opposite: 8 34 126
Whorled: 8 15 34
Alternate: 8 15 26 38 40 47 72 101 127

Simple: 15 26 34 38 40 47 72 101 126 127
Compound: 8

Densely scaly on under surface: 47
Not densely scaly: 8 15 26 34 38 40 72 101 126 127

Lobed: 8 38 72 126 127
Not lobed: 8 15 26 34 38 40 47 72 101 126 127

With teeth: 15 26 38 101 126 127
Without teeth: 8 15 26 34 40 47 72 126

8 Arisaema (AMA p. 33)
15 Berberis
26 Celtis
34 Cornus
38 Crataegus
40 Daphne (AMA p. 68)
47 Elaeagnus
72 Magnolia (AMA p. 194)
101 Prunus (AMA p. 138)
126 Viburnum
127 Vitis

KEY 20 Red or pink fruits more than 1 cm long with more than 1 seed

FRUITS

1-2 cm long: 1 3 8 15 17 20 25 33 34 38 44 45 50 54 61 68 69 78 88 95 96 98 104 107 108 109 116 117 118 123 125 127
More than 2 cm long: 17 22 35 41 54 61 72 78 86 95 98 104 108 109 123 127

Dense cluster of fruitlets resembling a blackberry: 78 109
Not resembling a blackberry: 1 3 8 15 17 20 22 25 33 34 35 38 41 44 45 50 54 61 68 69 72 86 88 95 96 98 104 107 108 116 117 118 123 125 127

Enclosed in a papery husk: 95 116
Not enclosed in a papery husk: 1 3 8 15 17 20 22 25 33 34 35 38 41 44 45 50 54 61 68 69 72 78 86 88 96 98 104 107 108 109 116 117 118 123 125 127

With 1 fruit or 1 compact cluster per plant: 8 20 34 35 44 61 86 88 98 109 123
With more than 1 per plant: 1 3 8 15 17 22 25 33 34 35 38 41 44 45 50 54 68 69 72 78 86 88 95 96 104 107 108 109 116 117 118 125 127

With floral remnants at apex: 1 3 8 15 20 22 25 34 35 38 68 78 86 88 96 98 104 107 108 117 125
Without floral remnants at apex: 1 8 15 17 20 25 33 41 44 45 50 54 61 68 69 72 78 86 88 95 96 98 109 116 118 123 127

With 2-10 seeds: 1 3 8 15 20 22 25 33 34 38 41 44 50 61 68 88 96 104 109 116 117 123 127
With more than 10 seeds: 1 17 22 35 45 50 54 61 68 69 72 78 86 95 96 98 107 108 109 116 118 123 125

PLANTS

Woody: 3 15 17 22 25 34 38 41 50 68 69 72 78 104 107 108 109 116 117 125 127
Not woody: 1 8 20 33 34 35 44 45 54 61 86 88 95 96 98 109 116 118 123

Creeping or climbing: 25 45 50 54 68 69 107 108 109 116 125 127
Not creeping or climbing: 1 3 8 15 17 20 22 33 34 35 38 41 44 45 50 54 61 68 69 72 78 86 88 95 96 98 104 107 108 109 116 117 118 123 125

With tendrils: 127
Without tendrils: 1 3 8 15 17 20 22 25 33 34 35 38 41 44 45 50 54 61 68 69 72 78 86 88 95 96 98 104 107 108 109 116 117 118 123 125

With spines: 15 25 35 38 69 86 104 107 108 109 116
Without spines: 1 3 8 17 20 22 25 33 34 41 44 45 50 54 61 68 69 72 78 88 95 96 98 104 107 108 109 116 117 118 123 125 127

LEAVES

Opposite: 1 8 17 22 33 34 45 50 54 68 95 98 108 109 116 117
Whorled: 8 15 17 33 34 45 54 69 88 107 123
Basal: 20 33 45 54 61
Alternate: 1 3 8 15 17 25 33 38 41 44 45 61 68 69 72 78 95 96 104 107 108 109 116 117 118 125 127

Simple: 3 15 17 20 22 25 33 34 38 41 44 50 61 68 69 72 78 95 96 98 104 107 109 116 118 123 125 127
Compound with 3 leaflets: 8 45 54 108 109 116
Compound with more than 3 leaflets: 1 8 88 108 109 116 117

1-3 per plant: 8 20 33 45 54 61 88 98 109 123
More than 3 per plant: 1 3 8 15 17 22 25 34 38 41 44 45 50 54 61 68 69 72 78 88 95 96 104 107 108 109 116 117 118 125 127

Peltate: 98
Not peltate: 1 3 8 15 17 20 22 25 33 34 35 38 41 44 45 50 54 61 68 69 72 78 86 88 95 96 98 104 107 108 109 116 117 118 123 125 127

With stalks (petioles): 1 3 8 15 17 20 22 25 33 34 38 41 45 50 54 61 68 69 72 78 88 95 96 98 104 107 108 109 116 117 123 125 127
Without stalks: 8 15 33 44 45 50 54 61 68 69 88 95 108 109 116 117 118 123 125

Lobed: 1 8 17 20 38 61 72 78 95 98 104 107 109 116 127
Not lobed: 1 3 8 15 17 20 22 25 33 34 38 41 44 45 50 54 68 69 72 78 88 95 96 104 108 109 116 117 118 123 125 127

With teeth: 1 3 15 17 25 38 45 50 54 61 78 88 95 98 104 107 108 109 116 117 125 127
Without teeth: 8 15 20 22 33 34 41 44 68 69 72 95 96 116 118 123 125

1 Actaea (AMA p. 21)
3 Amelanchier
8 Arisaema (AMA p. 33)
15 Berberis
17 Broussonetia
20 Calla (AMA pp. 43, 197)
22 Calycanthus (AMA p. 47)
25 Celastrus (AMA p. 53)
33 Convallaria (AMA pp. 6, 62)
34 Cornus
35 Coryphantha
38 Crataegus
41 Diospyros
44 Disporum
45 Duchesnia
50 Euonymus (AMA p. 79)
54 Fragaria
61 Hydrastis
68 Lonicera (AMA p. 109)
69 Lycium (AMA p. 110)
72 Magnolia (AMA p. 194)
78 Morus
86 Opuntia (AMA pp. 185, 196)
88 Panax
95 Physalis (AMA p. 132)
96 Phytolacca (AMA pp. 6, 133)
98 Podophyllum (AMA pp. 6, 136)
104 Pyrus
107 Ribes
108 Rosa (AMA p. 194)
109 Rubus
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
117 Sorbus
118 Streptopus (H&A p. 158)
123 Trillium
125 Vaccinium
127 Vitis

KEY 21 Blue fruits less than 1 cm long with 1 seed

FRUITS Spherical: 4 24 34 38 55 64 66 76 87 89 92 100 101 112 115 126 127
Oval or elliptic: 16 29 92 100 112 126

With floral remnants at apex: 16 34 38 55 64 126
Without floral remnants at apex: 4 16 24 29 55 64 66 76 87 89 92 100 101 112 115 127

PLANTS Woody: 4 16 29 34 38 64 66 76 87 89 92 101 112 115 126 127
Not woody: 24 55 100 115

Creeping or climbing: 4 16 55 64 76 89 100 115 127
Not creeping or climbing: 24 29 34 38 55 64 66 87 92 101 112 126

With tendrils: 4 89 115 127
Without tendrils: 4 16 24 29 34 38 55 64 66 76 87 92 100 101 112 126

With spines: 38 64 100 101 115
Without spines: 4 16 24 29 34 55 64 66 76 87 89 92 101 112 115 126 127

LEAVES Less than 0.5 cm wide: 55 64
More than 0.5 cm wide: 4 16 24 29 34 38 55 66 76 87 89 92 100 101 112 115 126 127

Opposite: 4 24 29 34 64 66 87 126
Whorled: 24 55 64 89
Alternate: 4 16 24 34 38 76 89 92 100 101 112 115 127

Simple: 4 16 29 34 38 55 64 66 76 87 92 100 101 112 115 126 127
Compound: 24 89

Peltate: 76
Not peltate: 4 16 24 29 34 38 55 64 66 87 89 92 100 101 112 115 126 127

Lobed: 4 24 38 76 100 112 126 127
Not lobed: 4 16 29 34 38 55 64 66 76 87 89 92 100 101 112 115 126 127

With teeth: 4 16 24 38 76 89 101 126 127
Without teeth: 16 29 34 55 64 66 76 87 92 100 112 115 126

4 Ampelopsis (H&A p. 153)
16 Berchemia (H&A p. 153)
24 Caulophyllum (AMA p. 52)
29 Chionanthus
34 Cornus
38 Crataegus
55 Galium
64 Juniperus
66 Ligustrum (AMA p. 107)
76 Menispermum (AMA pp. 10, 117)
87 Osmanthus
89 Parthenocissus (AMA p. 197, H&A p. 97)
92 Persea
100 Polygonum
101 Prunus (AMA p. 138)
112 Sassafras
115 Smilax (H&A p. 158)
126 Viburnum
127 Vitis

KEY 22 Blue fruits less than 1 cm long with more than 1 seed

FRUITS With floral remnants at apex: 3 5 31 34 38 55 57 64 68 99 125
Without floral remnants at apex: 4 21 24 29 31 42 55 64 66 68 73 89 99 115 127

With 2 seeds: 4 24 29 34 55 64 66 89 115
With 3-10 seeds: 3 4 5 21 29 31 38 42 57 64 66 68 73 89 99 115 125 127
With more than 10 seeds: 31 99 125

PLANTS Woody: 3 4 21 29 34 38 57 64 66 68 89 115 125 127
Not woody: 5 24 31 42 55 73 99 115

Creeping or climbing: 4 55 64 68 89 115 127
Not creeping or climbing: 3 5 21 24 29 31 34 38 42 55 57 64 66 68 73 99 125

With tendrils: 4 89 115 127
Without tendrils: 3 4 5 21 24 29 31 34 38 42 55 57 64 66 68 73 99 125

With spines: 5 38 64 115
Without spines: 3 4 5 21 24 29 31 34 42 55 57 64 66 68 73 89 99 115 125 127

LEAVES Less than 0.5 cm wide: 55 64
More than 0.5 cm wide: 3 4 5 21 24 29 31 34 38 42 55 57 66 68 73 89 99 115 125 127

Opposite: 4 5 21 24 29 34 64 66 68
Whorled with 2 whorls: 5 73
Whorled with more than 2 whorls: 5 24 55 64 89
Basal: 5 31
Alternate: 3 4 5 24 34 38 42 57 89 99 115 125 127

Simple: 3 4 21 29 31 34 38 42 55 57 64 66 68 73 99 115 125 127
Compound: 5 24 89

Peltate: 42
Not peltate: 3 4 5 21 24 29 31 34 38 55 57 64 66 68 73 89 99 115 125 127

Lobed: 4 24 38 42 127
Not lobed: 3 4 5 21 29 31 34 38 55 57 64 66 68 73 89 99 115 125 127

With teeth: 3 4 5 21 24 38 42 57 89 125 127
Without teeth: 29 31 34 55 57 64 66 68 73 99 115 125

3 Amelanchier
4 Ampelopsis (H&A p. 153)
5 Aralia
21 Callicarpa
24 Caulophyllum (AMA p. 52)
29 Chionanthus
31 Clintonia (H&A p. 154)
34 Cornus
38 Crataegus
42 Diphylleia (H&A p. 155)
55 Galium
57 Gaylussacia
64 Juniperus
66 Ligustrum (AMA p. 107)
68 Lonicera (AMA p. 109)
73 Medeola (H&A p. 156)
89 Parthenocissus (AMA p. 197, H&A p. 97)
99 Polygonatum (H&A p. 158)
115 Smilax (H&A p. 158)
125 Vaccinium
127 Vitis

KEY 23 Blue fruits more than 1 cm long with 1 seed

FRUITS Spherical: 38 64 76 84 87 92 101 112 126 127
Oval or elliptic: 29 84 92 101 112 126

With floral remnants at apex: 38 64 84 126
Without floral remnants at apex: 29 64 76 87 92 101 112 127

PLANTS Creeping or climbing: 64 76 127
Not creeping or climbing: 29 38 64 84 87 92 101 112 126

With tendrils: 127
Without tendrils: 29 38 64 76 84 87 92 101 112 126

With spines: 38 64 101
Without spines: 29 64 76 84 87 92 101 112 126 127

LEAVES Less than 0.5 cm wide: 64
More than 0.5 cm wide: 29 38 76 84 87 92 101 112 126 127

Opposite: 29 64 87 126
Whorled: 64
Alternate: 38 76 84 92 101 112 127

Peltate: 76
Not peltate: 29 38 64 84 87 92 101 112 126 127

Lobed: 38 76 112 126 127
Not lobed: 29 38 64 76 84 87 92 101 112 126 127

With teeth: 38 76 84 101 126 127
Without teeth: 29 64 76 84 87 92 112 126

29 Chionanthus
38 Crataegus
64 Juniperus
76 Menispermum (AMA pp. 10, 117)
84 Nyssa
87 Osmanthus
92 Persea
101 Prunus (AMA p. 138)
112 Sassafras
126 Viburnum
127 Vitis

KEY 24 Blue fruits more than 1 cm long with more than 1 seed

FRUITS With floral remnants at apex: 3 31 38 57 64 68 99 125
Without floral remnants at apex: 2 29 31 42 64 68 73 99 127

With 2 seeds: 29 64 127
With 3-10 seeds: 2 3 29 31 38 42 57 64 68 73 99 127
With more than 10 seeds: 31 99 125

PLANTS Woody: 2 3 29 38 57 64 68 125 127
Not woody: 31 42 73 99

Creeping or climbing: 2 64 68 127
Not creeping or climbing: 3 29 31 38 42 57 64 68 73 99 125

With tendrils: 127
Without tendrils: 2 3 29 31 38 42 57 64 68 73 99 125

With spines: 38 64
Without spines: 2 3 29 31 42 57 64 68 73 99 125 127

LEAVES Less than 1 cm wide: 64
More than 1 cm wide: 2 3 29 31 38 42 57 68 73 99 125 127

Opposite: 29 64 68
Whorled: 2 64 73
Basal: 31
Alternate: 2 3 38 42 57 99 125 127

Simple: 3 29 31 38 42 57 64 68 73 99 125 127
Compound: 2

Peltate: 42
Not peltate: 2 3 29 31 38 57 64 68 73 99 125 127

Lobed: 38 42 127
Not lobed: 2 3 29 31 38 57 64 68 73 99 125 127

With teeth: 3 38 42 57 125 127
Without teeth: 2 29 31 57 64 68 73 99 125

2 Akebia
3 Amelanchier
29 Chionanthus
31 Clintonia (H&A p. 154)
38 Crataegus
42 Diphylleia (H&A p. 155)
57 Gaylussacia
64 Juniperus
68 Lonicera (AMA p. 109)
73 Medeola (H&A p. 156)
99 Polygonatum (H&A p. 158)
125 Vaccinium
127 Vitis

KEY 25 Purple fruits less than 1 cm long with 1 seed

FRUITS
With floral remnants at apex: 26 38 52 55 64 126
Without floral remnants at apex: 7 24 26 29 52 55 64 76 87 92 100 101 112 114 127

PLANTS
Woody: 7 26 29 38 64 76 87 92 101 112 126 127
Not woody: 24 52 55 100 114

Creeping or climbing: 7 52 55 64 76 100 101 127
Not creeping or climbing: 24 26 29 38 52 55 64 87 92 101 112 114 126

With tendrils: 127
Without tendrils: 7 24 26 29 38 52 55 64 76 87 92 100 101 112 114 126

With spines: 38 64 100 101
Without spines: 7 24 26 29 52 55 64 76 87 92 100 101 112 114 126 127

LEAVES
Less than 0.5 cm wide: 55 64
More than 0.5 cm wide: 7 24 26 29 38 52 55 76 87 92 100 101 112 114 126 127

Opposite: 24 29 52 64 87 126
Whorled: 24 55 64
Alternate: 7 24 26 38 52 76 92 100 101 112 114 127

Simple: 7 26 29 38 52 55 64 76 87 92 100 101 112 114 126 127
Compound: 24 52

Peltate: 76
Not peltate: 7 24 26 29 38 52 55 64 87 92 100 101 112 114 126 127

Lobed: 24 38 52 76 100 112 126 127
Not lobed: 7 26 29 38 52 55 64 76 87 92 100 101 112 114 126 127

With teeth: 7 24 26 38 76 101 126 127
Without teeth: 7 26 29 52 55 64 76 87 92 100 112 114 126

7 Arctostaphylos
24 Caulophyllum (AMA p. 52)
26 Celtis
29 Chionanthus
38 Crataegus
52 Floerkea
55 Galium
64 Juniperus
76 Menispermum (AMA pp. 10, 117)
87 Osmanthus
92 Persea
100 Polygonum
101 Prunus (AMA p. 138)
112 Sassafras
114 Smilacina
126 Viburnum
127 Vitis

KEY 26 Purple fruits less than 1 cm long with more than 1 seed

FRUITS

Dense cluster of fruitlets resembling a blackberry: 78 109
Not resembling a blackberry: 3 5 7 9 21 24 29 31 38 48 50 55 64 68 73 95 96 107 110 114 116 119 125 127

Enclosed in a papery husk: 95 116
Not enclosed in a husk: 3 5 7 9 21 24 29 31 38 48 50 55 64 68 73 78 96 107 109 110 114 116 119 125 127

With floral remnants at apex: 3 5 9 31 38 55 64 68 78 96 107 110 119 125
Without floral remnants at apex: 7 21 24 29 31 48 50 55 64 68 73 78 95 96 109 114 116 127

With 2 seeds: 24 29 55 64 114 119 127
With 3-10 seeds: 3 5 7 9 21 29 31 38 48 50 64 68 73 96 109 110 127
With more than 10 seeds: 31 50 78 95 96 107 109 116 125

PLANTS

Woody: 3 5 7 9 21 29 38 48 50 64 68 78 107 109 110 119 125 127
Not woody: 5 24 31 55 73 95 96 114 116

Creeping or climbing: 7 48 50 55 64 68 109 127
Not creeping or climbing: 3 5 9 21 24 29 31 38 48 50 55 64 68 73 78 95 96 107 109 110 114 116 119 125

With tendrils: 127
Without tendrils: 3 5 7 9 21 24 29 31 38 48 50 55 64 68 73 78 95 96 107 109 110 114 116 119 125

With spines: 5 38 64 107 109 116
Without spines: 3 5 7 9 21 24 29 31 48 50 55 64 68 73 78 95 96 107 109 110 114 116 119 125 127

LEAVES

Opposite: 5 21 24 29 50 64 68 95 109 110 119
Whorled: 24 55 64 73 107
Basal: 5 31
Alternate: 3 5 7 9 24 38 48 78 95 96 107 109 114 116 125 127

Simple: 3 7 9 21 29 31 38 48 50 55 64 68 73 78 95 96 107 114 116 119 125 127
Compound: 5 24 109 110

Lobed: 24 38 78 95 107 109 116 127
Not lobed: 3 5 7 9 21 29 31 38 48 50 55 64 68 73 78 95 96 109 110 114 116 119 125 127

With teeth: 3 5 7 9 21 24 38 50 78 95 107 109 110 116 119 125 127
Without teeth: 7 29 31 48 55 64 68 73 95 96 114 116 119 125

3 Amelanchier
5 Aralia
7 Arctostaphylos
9 Aronia
21 Callicarpa
24 Caulophyllum (AMA p. 52)
29 Chionanthus
31 Clintonia (H&A p. 154)
38 Crataegus
48 Empetrum
50 Euonymus (AMA p. 79)
55 Galium
64 Juniperus
68 Lonicera (AMA p. 109)
73 Medeola (H&A p. 156)
78 Morus
95 Physalis (AMA p. 132)
96 Phytolacca (AMA pp. 6, 133)
107 Ribes
109 Rubus
110 Sambucus (AMA p. 147)
114 Smilacina
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
119 Symphoricarpos (AMA p. 165)
125 Vaccinium
127 Vitis

KEY 27 Purple fruits more than 1 cm long with 1 seed

FRUITS 1-2 cm long: 26 29 38 64 76 84 87 92 101 112 126 127
More than 2 cm long: 11 38 84 101 127

With floral remnants at apex: 26 38 64 84 126
Without floral remnants at apex: 11 26 29 64 76 87 92 101 112 127

PLANTS Creeping or climbing: 64 76 101 127
Not creeping or climbing: 11 26 29 38 64 84 87 92 101 112 126

With tendrils: 127
Without tendrils: 11 26 29 38 64 76 84 87 92 101 112 126

With spines: 38 64 101
Without spines: 11 26 29 64 76 84 87 92 101 112 126 127

LEAVES Opposite: 29 64 87 126
Alternate: 11 26 38 76 84 92 101 112 127

Peltate: 76
Not peltate: 11 26 29 38 64 84 87 92 101 112 126 127

Lobed: 38 76 112 126 127
Not lobed: 11 26 29 38 64 76 84 87 92 101 112 126 127

With teeth: 26 38 76 84 101 126 127
Without teeth: 11 26 29 64 76 84 87 92 112 126

11 Asimina (AMA p. 192)
26 Celtis
29 Chionanthus
38 Crataegus
64 Juniperus
76 Menispermum (AMA pp. 10, 117)
84 Nyssa
87 Osmanthus
92 Persea
101 Prunus (AMA p. 138)
112 Sassafras
126 Viburnum
127 Vitis

KEY 28 Purple fruits more than 1 cm long with more than 1 seed

FRUITS

1-2 cm long: 3 10 29 31 38 50 51 60 64 68 73 78 90 95 96 107 109 116 123 125 127
More than 2 cm long: 2 11 22 35 38 41 51 78 86 90 95 109 120 123 127

Dense cluster of fruitlets resembling a blackberry: 78 109
Not resembling a blackberry: 2 3 10 11 22 29 31 35 38 41 50 51 60 64 68 73 86 90 95 96 107 116 120 123 125 127

Enclosed in a papery husk: 95 116
Not enclosed in a husk: 2 3 10 11 22 29 31 35 38 41 50 51 60 64 68 73 78 86 90 96 107 109 116 120 123 125 127

With floral remnants at apex: 3 10 22 31 35 38 51 60 64 68 78 86 96 107 120 125
Without floral remnants at apex: 2 11 29 31 41 50 64 68 73 78 90 95 96 109 116 120 123 127

With 2-10 seeds: 2 3 10 11 22 29 31 38 41 50 60 64 68 73 96 123 127
With more than 10 seeds: 10 22 31 35 50 51 60 78 86 90 95 96 107 109 116 120 123 125

PLANTS

Woody: 2 3 11 22 29 38 41 50 51 64 68 78 90 107 109 125 127
Not woody: 10 31 35 60 73 86 90 95 96 116 120 123

Creeping or climbing: 2 10 50 60 64 68 90 109 120 123 127
Not creeping or climbing: 3 10 11 22 29 31 35 38 41 50 51 60 64 68 73 78 86 95 96 107 109 116 120 123 125

With tendrils: 90 127
Without tendrils: 2 3 10 11 22 29 31 35 38 41 50 51 60 64 68 73 78 86 95 96 107 109 116 120 123 125

With spines: 35 38 64 86 107 109 116
Without spines: 2 3 10 11 22 29 31 41 50 51 60 64 68 73 78 90 95 96 107 116 120 123 125 127

LEAVES

Less than 0.5 cm wide: 64
More than 0.5 cm wide: 2 3 10 11 22 29 31 38 41 50 51 60 68 73 78 90 95 96 107 109 116 120 123 125 127

Opposite: 22 29 50 64 68 95 109
Whorled with 1 whorl per plant: 123
Whorled with 2 whorls per plant: 73
Whorled with more than 2 whorls per plant: 2 64 107
Basal: 10 31 60 120
Alternate: 2 3 11 38 41 51 78 90 95 96 107 109 116 125 127

Simple: 3 10 11 22 29 31 38 41 50 51 60 64 68 73 78 90 95 96 107 116 120 123 125 127
Compound: 2 109

Lobed: 10 38 51 60 78 90 95 107 109 116 127
Not lobed: 2 3 10 11 22 29 31 38 41 50 60 64 68 73 78 95 96 109 116 120 123 125 127

With teeth: 3 38 50 78 90 95 107 109 116 125 127
Without teeth: 2 10 11 22 29 31 41 51 60 64 68 73 90 95 96 116 120 123 125

2 Akebia
3 Amelanchier
10 Asarum
11 Asimina (AMA p. 192)
22 Calycanthus (AMA p. 47)
29 Chionanthus
31 Clintonia (H&A p. 154)
35 Coryphantha
38 Crataegus
41 Diospyros
50 Euonymus (AMA p. 79)
51 Ficus (AMA p. 198)
60 Hexastylis
64 Juniperus
68 Lonicera (AMA p. 109)
73 Medeola (H&A p. 156)
78 Morus
86 Opuntia (AMA pp. 185, 196)
90 Passiflora
95 Physalis (AMA p. 132)
96 Phytolacca (AMA pp. 6, 133)
107 Ribes
109 Rubus
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
120 Symplocarpus (AMA p. 166)
123 Trillium
125 Vaccinium
127 Vitis

KEY 29 Green fruits less than 1 cm long with 1 seed

FRUITS
With floral remnants at apex: 91 97 122
Without floral remnants at apex: 43 71 91 97 114 115 121 122

PLANTS
Woody: 43 97 115 121 122
Not woody: 71 91 114 115 122

Creeping or climbing: 115 121 122
Not creeping or climbing: 43 71 91 97 114 121 122

With tendrils: 115
Without tendrils: 43 71 91 97 114 121 122

With spines: 115
Without spines: 43 71 91 97 114 115 121 122

LEAVES
Less than 0.5 cm wide: 121
More than 0.5 cm wide: 43 71 91 97 114 115 122

Opposite or basal: 91 121 122
Alternate: 43 71 97 114 115 121 122

Simple: 43 71 91 97 114 115 121
Compound: 122

One to three per plant: 71 91
More than three per plant: 43 91 97 114 115 121 122

Lobed: 91 122
Not lobed: 43 71 91 97 114 115 121 122

With teeth: 97 122
Without teeth: 43 71 91 114 115 121 122

43 Dirca (AMA pp. 74, 198)
71 Maianthemum (H&A p. 156)
91 Peltandra
97 Planera
114 Smilacina
115 Smilax (H&A p. 158)
121 Taxus (AMA p. 167)
122 Toxicodendron (POISONOUS TO TOUCH! AMA pp. 188, 199)

KEY 30 Green fruits less than 1 cm long with more than 1 seed

FRUITS

Dense cluster of fruitlets resembling a blackberry: 78
Not resembling a blackberry: 71 75 91 95 96 107 110 114 115 116 125

Enclosed in a papery husk: 95 116
Not enclosed in a husk: 71 75 78 91 96 107 110 114 115 116 125

With floral remnants at apex: 75 78 91 96 107 110 125
Without floral remnants at apex: 71 78 91 95 96 114 115 116

With 2-10 seeds: 71 91 96 110 114 115 116
With more than 10 seeds: 75 78 95 96 107 116 125

PLANTS

Woody: 78 107 110 115 116 125
Not woody: 71 75 91 95 96 114 115 116

Creeping or climbing: 75 115 116 125
Not creeping or climbing: 71 78 91 95 96 107 110 114 116 125

With tendrils: 75 115
Without tendrils: 71 78 91 95 96 107 110 114 116 125

With spines: 107 115 116
Without spines: 71 75 78 91 95 96 107 110 114 115 116 125

LEAVES

Opposite: 95 110 116
Whorled or basal: 91 107
Alternate: 71 75 78 95 96 107 114 115 116 125

Simple: 71 75 78 91 95 96 107 114 115 116 125
Compound: 110 116

One to three per plant: 71 91
More than 3 per plant: 75 78 91 95 96 107 110 114 115 116 125

Lobed: 75 78 91 95 107 116
Not lobed: 71 78 91 95 96 110 114 115 116 125

With teeth: 75 78 95 107 110 116 125
Without teeth: 71 91 95 96 114 115 116 125

71 Maianthemum (H&A p. 156)
75 Melothria
78 Morus
91 Peltandra
95 Physalis (AMA p. 132)
96 Phytolacca (AMA pp. 6, 133)
107 Ribes
110 Sambucus (AMA p. 147)
114 Smilacina
115 Smilax (H&A p. 158)
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
125 Vaccinium

KEY 31 Green fruits more than 1 cm long with 1 seed

FRUITS 1-3 cm long: 18 74 81 91 103 122
More than 3 cm long: 11 63

Spherical or oval; about as long as wide: 63 74 91 103 122
Elliptic; longer than wide: 11 18 81 91 103

With floral remnants at apex: 18 81 91 103 122
Without floral remnants at apex: 11 63 74 91 122

PLANTS Woody: 11 18 63 74 81 103 122
Not woody: 91 122

Creeping or climbing: 122
Not creeping or climbing: 11 18 63 74 81 91 103 122

LEAVES Opposite or basal: 18 63 74 81 91 122
Alternate: 11 63 74 103 122

Simple: 11 18 81 91 103
Once compound: 63 122
Twice compound: 74

Lobed: 91 122
Not lobed: 11 18 63 74 81 91 103 122

With teeth: 63 74 122
Without teeth: 11 18 81 91 103 122

11 Asimina (AMA p. 192)
18 Buckleya
63 Juglans (AMA p. 193))
74 Melia (AMA p. 115)
81 Nestronia
91 Peltandra
103 Pyrularia (H&A p. 158)
122 Toxicodendron (POISONOUS TO TOUCH! AMA pp. 188, 199)

KEY 32 Green fruits more than 1 cm long with more than 1 seed

FRUITS

1-2 cm long: 38 51 75 78 82 83 90 91 95 96 98 104 107 116 125
More than 2 cm long: 11 35 46 51 70 72 78 82 83 86 90 95 98 104 120

Flattened, wider than long: 96
Spherical, about as long as wide: 35 38 46 51 70 82 83 86 91 95 98 104 107 116 120 125
Ovoid or ellipsoid, longer than wide: 11 35 46 51 72 75 78 83 86 90 91 104 120

Enclosed in a papery husk: 82 95 116
Not enclosed in a husk: 11 35 38 46 51 70 72 75 78 83 86 90 91 96 98 104 107 116 120 125

With soft prickles: 46 107
Without prickles: 11 35 38 51 70 72 75 78 82 83 86 90 91 95 96 98 104 107 116 120 125

With floral remnants at apex: 35 38 46 51 75 78 83 86 91 96 98 104 107 120 125
Without floral remnants at apex: 11 46 70 72 78 82 83 90 91 95 96 98 116 120

With 2-10 seeds: 11 38 46 91 96 104 116
With more than 10 seeds: 35 51 70 72 75 78 82 83 86 90 95 96 98 107 116 120 125

PLANTS

Woody: 11 38 51 70 72 78 90 104 107 116 125
Not woody: 35 46 75 82 83 86 90 91 95 96 98 116 120

Creeping or climbing: 46 75 90 116 125
Not creeping or climbing: 11 35 38 51 70 72 78 82 83 86 91 95 96 98 104 107 116 120 125

With tendrils: 46 75 90
Without tendrils: 11 35 38 51 70 72 78 82 83 86 90 91 95 96 98 104 107 116 120 125

With spines: 35 38 46 70 86 104 107 116
Without spines: 11 46 51 72 75 78 82 83 90 91 95 96 98 104 107 116 120 125

Growing in water: 83 91 125
Not growing in water: 11 35 38 46 51 70 72 75 78 82 86 90 91 95 96 98 104 107 116 120 125

With a skunklike odor: 120
Without a skunklike odor: 11 35 38 46 51 70 72 75 78 82 83 86 90 91 95 96 98 104 107 116 125

LEAVES

Opposite: 95 98 116
Whorled or basal: 83 91 107 120
Alternate: 11 38 46 51 70 72 75 78 82 90 95 96 104 107 116 125

Simple: 11 38 46 51 70 72 75 78 82 83 90 91 95 96 98 104 107 116 120 125
Compound: 116

Peltate: 98
Not peltate: 11 38 46 51 70 72 75 78 82 83 90 91 95 96 98 104 107 116 120 125

Lobed: 38 46 51 72 75 78 82 83 90 91 95 98 104 107 116
Not lobed: 11 70 72 78 82 83 91 95 96 104 116 120 125

With teeth: 38 46 75 78 82 90 95 98 104 107 116 125
Without teeth: 11 51 70 72 83 90 91 95 96 116 120 125

11 Asimina (AMA p. 192)
35 Coryphantha
38 Crataegus
46 Echinocystis
51 Ficus (AMA p. 198)
70 Maclura (AMA p. 194)
72 Magnolia (AMA p. 194)
75 Melothria
78 Morus
82 Nicandra (H&A p. 140)
83 Nymphaea
86 Opuntia (AMA pp. 185, 196)
90 Passiflora
91 Peltandra
95 Physalis (AMA p. 132)
96 Phytolacca (AMA pp. 6, 133)
98 Podophyllum (AMA pp. 6, 136)
104 Pyrus
107 Ribes
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
120 Symplocarpus (AMA p. 166)
125 Vaccinium

KEY 33 Black fruits less than 1 cm long with 1 seed

FRUITS
With floral remnants at apex: 16 26 38 55 64 126
Without floral remnants at apex: 4 7 16 19 26 30 55 64 66 76 89 92 101 112 114 115 127

PLANTS
Woody: 4 7 16 19 26 30 38 64 66 76 89 92 101 112 115 126 127
Not woody: 55 114 115

Creeping or climbing: 4 7 16 30 55 64 76 89 101 115 127
Not creeping or climbing: 19 26 38 55 64 66 92 101 112 114 126

With tendrils: 4 30 89 115 127
Without tendrils: 4 7 16 19 26 38 55 64 66 76 92 101 112 114 126

With spines: 19 38 64 101 115
Without spines: 4 7 16 19 26 30 55 64 66 76 89 92 101 112 114 115 126 127

LEAVES
Less than 0.5 cm wide: 55 64
More than 0.5 cm wide: 4 7 16 19 26 30 38 55 66 76 89 92 101 112 114 115 126 127

Opposite: 4 30 64 66 126
Whorled: 19 55 64 89
Alternate: 4 7 16 19 26 30 38 76 89 92 101 112 114 115 127

Simple: 7 16 19 26 30 38 55 64 66 76 92 101 112 114 115 126 127
Compound with 3 leaflets: 30
Compound with 5-7 leaflets: 89
Compound with more than 7 leaflets: 4

Peltate: 76
Not peltate: 4 7 16 19 26 30 38 55 64 66 89 92 101 112 114 115 126 127

Lobed: 4 30 38 76 112 126 127
Not lobed: 4 7 16 19 26 30 38 55 64 66 76 89 92 101 112 114 115 126 127

With teeth: 4 7 16 26 30 38 76 89 101 126 127
Without teeth: 7 16 19 26 55 64 66 76 92 112 114 115 126

4 Ampelopsis (H&A p. 153)
7 Arctostaphylos
16 Berchemia (H&A p. 153)
19 Bumelia
26 Celtis
30 Cissus
38 Crataegus
55 Galium
64 Juniperus
66 Ligustrum (AMA p. 107)
76 Menispermum (AMA pp. 10, 117)
89 Parthenocissus (AMA p. 197, H&A p. 97)
92 Persea
101 Prunus (AMA p. 138)
112 Sassafras
114 Smilacina
115 Smilax (H&A p. 158)
126 Viburnum
127 Vitis

KEY 34 Black fruits less than 1 cm long with more than 1 seed

FRUITS
Dense cluster of fruitlets resembling a blackberry: 78 109
Not resembling a blackberry: 3 4 5 7 9 30 31 38 48 55 57 59 62 64 66 68 73 75 89 96 99 105 107 110 114 115 116 125 127

With floral remnants at apex: 3 5 9 31 38 55 57 59 64 68 73 75 78 96 99 107 110 125
Without floral remnants at apex: 4 7 30 31 48 55 62 64 66 68 73 78 89 96 99 105 109 114 115 116 127

With 2-10 seeds: 3 4 5 7 9 30 31 38 48 55 57 59 62 64 66 68 73 89 96 99 105 110 114 115 127
With more than 10 seeds: 31 75 78 96 99 107 109 116 125

PLANTS
Woody: 3 4 5 7 9 30 38 48 57 59 62 64 66 68 78 89 105 107 109 110 115 125 127
Not woody: 5 31 55 73 75 96 99 110 114 115 116

Creeping or climbing: 4 7 30 48 55 59 64 68 75 89 107 109 115 127
Not creeping or climbing: 3 5 9 31 38 55 57 62 64 66 68 73 78 96 99 105 107 109 110 114 116 125

With tendrils: 4 30 75 89 115 127
Without tendrils: 3 4 5 7 9 31 38 48 55 57 59 62 64 66 68 73 78 96 99 105 107 109 110 114 116 125

With spines: 5 38 64 105 107 109 115 116
Without spines: 3 4 5 7 9 30 31 48 55 57 59 62 64 66 68 73 75 78 89 96 99 105 107 110 114 115 116 125 127

LEAVES
Less than 0.5 cm wide: 48 55 64
More than 0.5 cm wide: 3 4 5 7 9 30 31 38 55 57 59 62 66 68 73 75 78 89 96 99 105 107 109 110 114 115 116 125 127

Opposite: 4 5 30 64 66 68 105 109 110
Whorled: 5 55 64 73 89 107
Basal: 31
Alternate: 3 4 5 7 9 30 38 48 57 59 62 75 78 89 96 99 107 109 114 115 116 125 127

Simple: 3 7 9 30 31 38 48 55 57 59 62 64 66 68 73 75 78 96 99 105 107 114 115 116 125 127
Compound with 3 leaflets: 30 89 109
Compound with 5-7 leaflets: 89 109 110
Compound with more than 7 leaflets: 4 5 110

With parallel venation: 5 31 48 64 73 99 114 115
With net venation: 3 4 5 7 9 30 38 48 55 57 59 62 66 68 73 75 78 89 96 105 107 109 110 115 116 125 127

Lobed: 4 30 38 59 62 75 78 107 109 116 127
Not lobed: 3 4 5 7 9 30 31 38 48 55 57 59 62 64 66 68 73 78 89 96 99 105 109 110 114 115 116 125 127

With teeth: 3 4 5 7 9 30 38 57 62 73 75 78 89 105 107 109 110 116 125 127
Without teeth: 7 31 48 55 57 59 62 64 66 68 73 96 99 105 114 115 116 125

3 Amelanchier
4 Ampelopsis (H&A p. 153)
5 Aralia
7 Arctostaphylos
9 Aronia
30 Cissus
31 Clintonia (H&A p. 154)
38 Crataegus
48 Empetrum
55 Galium
57 Gaylussacia
59 Hedera (AMA pp. 87, 192)
62 Ilex (AMA pp. 6, 97)
64 Juniperus
66 Ligustrum (AMA p. 107)
68 Lonicera (AMA p. 109)
73 Medeola (H&A p. 156)
75 Melothria
78 Morus
89 Parthenocissus (AMA p. 197, H&A p. 97)
96 Phytolacca (AMA pp. 6, 133)
99 Polygonatum (H&A p. 158)
105 Rhamnus (AMA p. 140)
107 Ribes
109 Rubus
110 Sambucus (AMA p. 147)
114 Smilacina
115 Smilax (H&A p. 158)
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
125 Vaccinium
127 Vitis

KEY 35 Black fruits more than 1 cm long with 1 seed

FRUITS 1-2 cm long: 19 23 26 38 53 64 76 84 92 101 112 126 127
More than 2 cm long: 23 63 84 101 127

About as long as wide: 19 23 26 38 63 64 76 84 92 101 112 126 127
Longer than wide: 53 84 92 101 112 126

With floral remnants at apex: 26 38 64 84 126
Without floral remnants at apex: 19 23 26 53 63 64 76 92 101 112 127

PLANTS Creeping or climbing: 23 64 76 101 127
Not creeping or climbing: 19 26 38 53 63 64 84 92 101 112 126

With tendrils: 127
Without tendrils: 19 23 26 38 53 63 64 76 84 92 101 112 126

With spines: 19 38 64 101
Without spines: 19 23 26 53 63 64 76 84 92 101 112 126 127

LEAVES Less than 0.5 cm wide: 64
More than 0.5 cm wide: 19 23 26 38 53 63 76 84 92 101 112 126 127

Opposite: 53 63 64 126
Whorled: 19 64
Alternate: 19 23 26 38 63 76 84 92 101 112 127

Simple: 19 23 26 38 53 64 76 84 92 101 112 126 127
Compound: 63

Lobed: 23 38 76 112 126 127
Not lobed: 19 26 38 53 63 64 76 84 92 101 112 126 127

With teeth: 26 38 53 63 76 84 101 126 127
Without teeth: 19 23 26 53 64 76 84 92 112 126

19 Bumelia
23 Calycocarpum
26 Celtis
38 Crataegus
53 Forestiera (H&A p. 155)
63 Juglans (AMA p. 193))
64 Juniperus
76 Menispermum (AMA pp. 10, 117)
84 Nyssa
92 Persea
101 Prunus (AMA p. 138)
112 Sassafras
126 Viburnum
127 Vitis

KEY 36 Black fruits more than 1 cm long with more than 1 seed

FRUITS

1-2 cm long: 3 13 31 38 57 64 68 73 75 78 90 93 96 99 107 109 116 125 127
More than 2 cm long: 14 38 78 90 109 127

Dense cluster of fruitlets resembling a blackberry: 14 78 109
Not resembling a blackberry: 3 13 14 31 38 57 64 68 73 75 90 93 96 99 107 116 125 127

With floral remnants at apex: 3 31 38 57 64 68 75 78 96 99 107 125
Without floral remnants at apex: 13 14 31 64 68 73 78 90 93 96 99 109 116 127

With 2-10 seeds: 3 31 38 57 64 68 73 93 96 99 127
With more than 10 seeds: 13 14 31 75 78 90 96 99 107 109 116 125

PLANTS

Woody: 3 38 57 64 68 78 90 93 107 109 125 127
Not woody: 13 14 31 73 75 90 96 99 116

Creeping or climbing: 64 68 75 90 107 109 127
Not creeping or climbing: 3 13 14 31 38 57 64 68 73 78 93 96 99 107 109 116 125

With tendrils: 75 90 127
Without tendrils: 3 13 14 31 38 57 64 68 73 78 93 96 99 107 109 116 125

With spines: 38 64 107 109 116
Without spines: 3 13 14 31 57 64 68 73 75 78 90 93 96 99 107 109 116 125 127

LEAVES

Less than 0.5 cm wide: 64
More than 0.5 cm wide: 3 13 14 31 38 57 68 73 75 78 90 93 96 99 107 109 116 125 127

Opposite: 13 64 68 93 109
Whorled: 13 64 73 107
Basal: 31
Alternate: 3 13 14 38 57 75 78 90 96 99 107 109 116 125 127

Simple: 3 13 14 31 38 57 64 68 73 75 78 90 96 99 107 116 125 127
Compound: 93 109

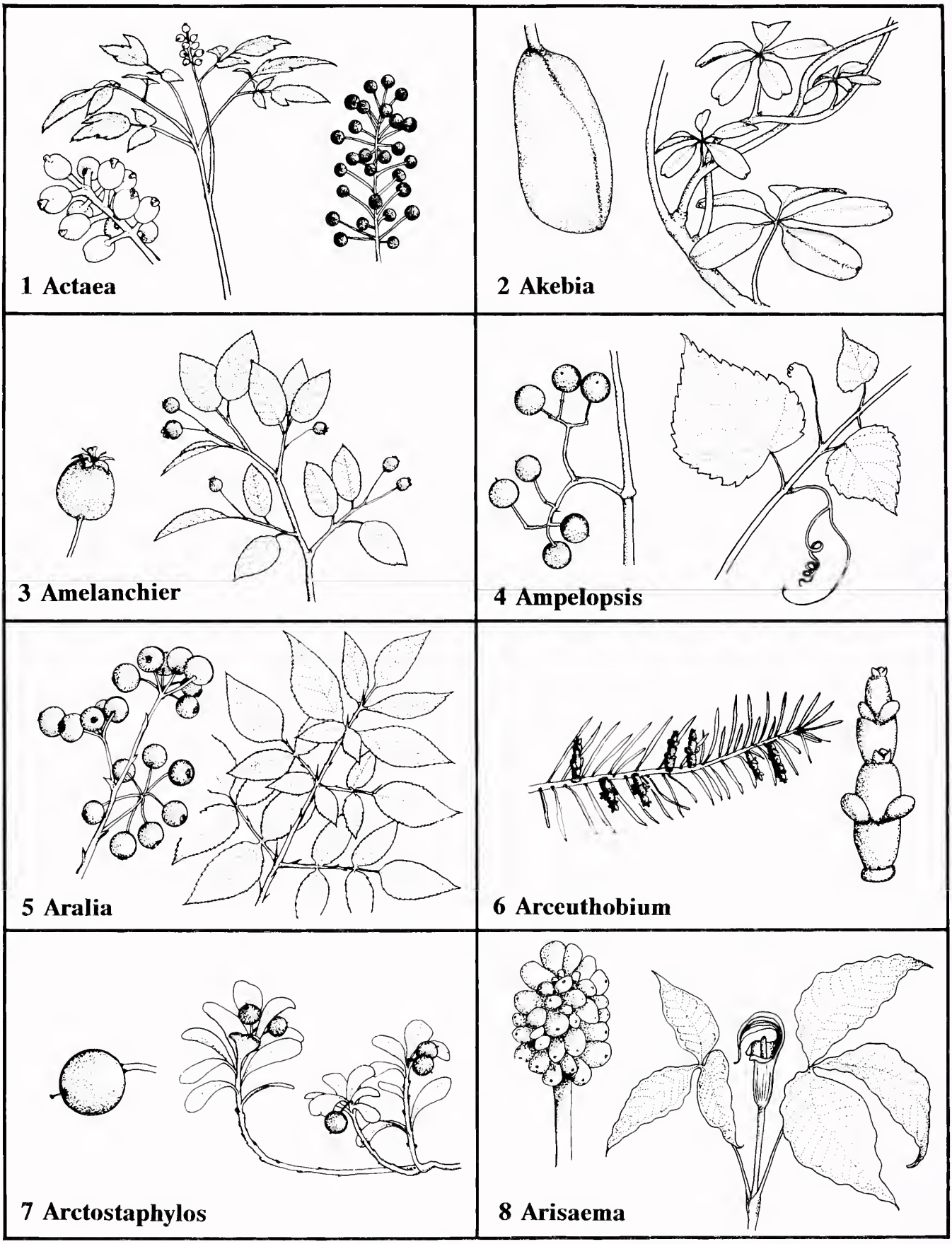
With major veins parallel: 14 31 64 73 99
With net venation: 3 13 38 57 68 73 75 78 90 93 96 107 109 116 125 127

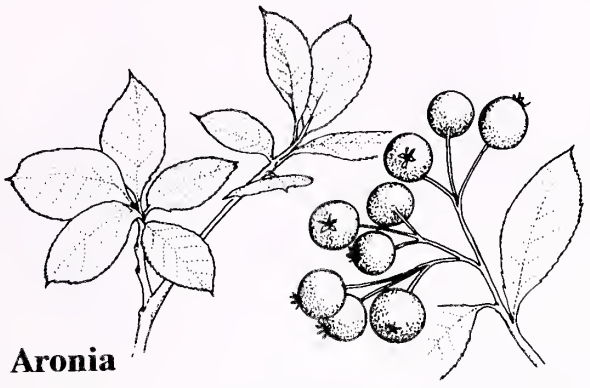
Lobed: 38 75 78 90 107 116 127
Not lobed: 3 13 14 31 38 57 64 68 73 78 93 96 99 109 116 125 127

With teeth: 3 38 57 75 78 90 107 109 116 125 127
Without teeth: 13 14 31 57 64 68 73 90 93 96 99 116 125

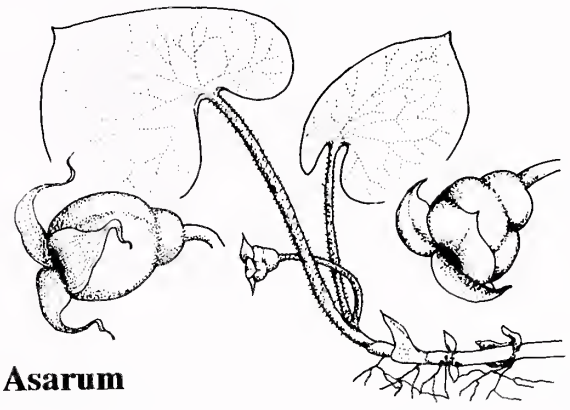
3 Amelanchier
13 Atropa (AMA p. 36)
14 Belamcanda (H&A p. 153)
31 Clintonia (H&A p. 154)
38 Crataegus
57 Gaylussacia
64 Juniperus
68 Lonicera (AMA p. 109)
73 Medeola (H&A p. 156)
75 Melothria
78 Morus
90 Passiflora
93 Phellodendron
96 Phytolacca (AMA pp. 6, 133)
99 Polygonatum (H&A p. 158)
107 Ribes
109 Rubus
116 Solanum (AMA pp. 10, 157, 158, 194, 195)
125 Vaccinium
127 Vitis

ILLUSTRATIONS

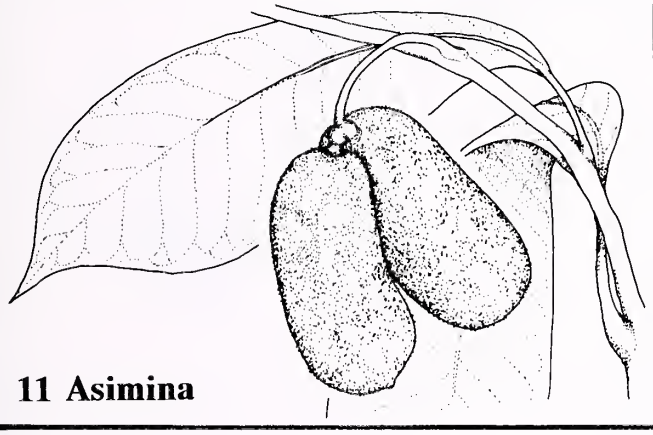

1 Actaea
2 Akebia
3 Amelanchier
4 Ampelopsis
5 Aralia
6 Arceuthobium
7 Arctostaphylos
8 Arisaema



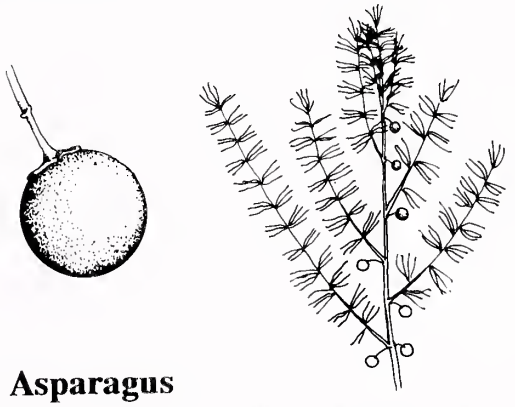
9 Aronia



10 Asarum

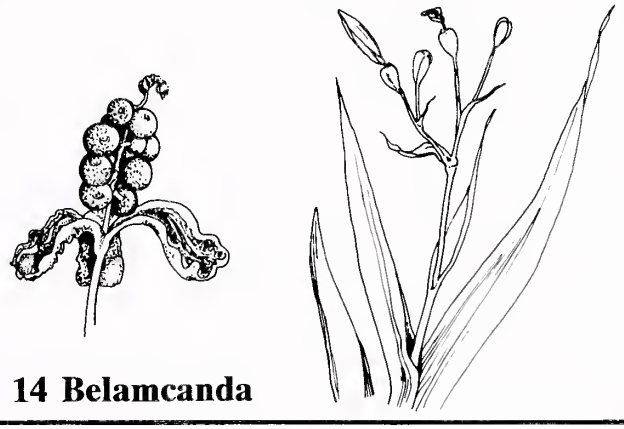


11 Asimina



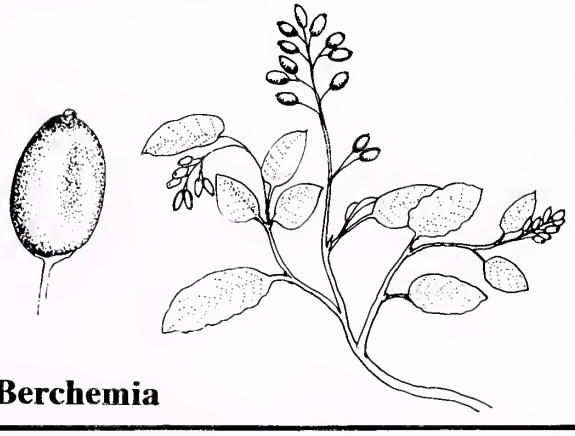
12 Asparagus

13 Atropa

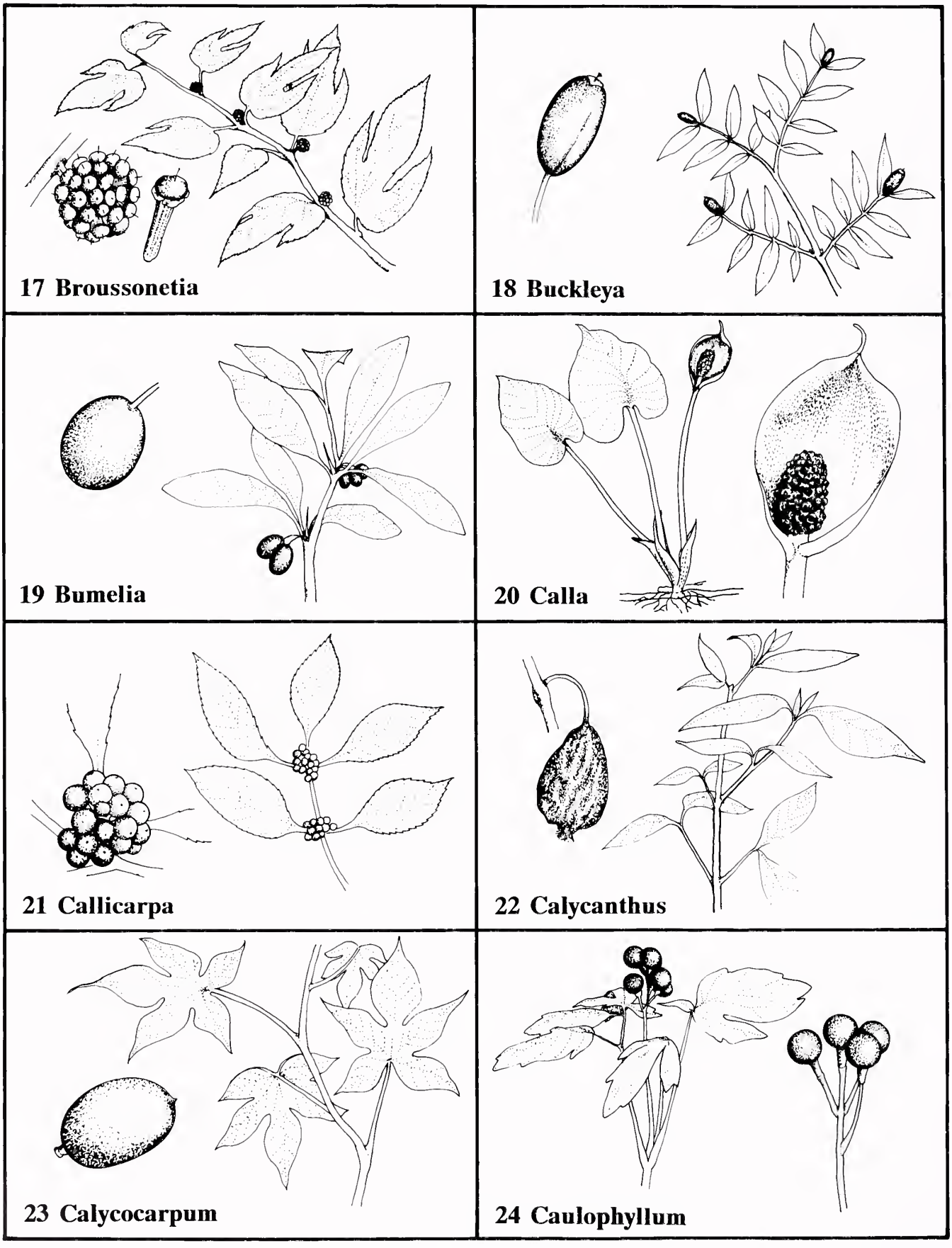


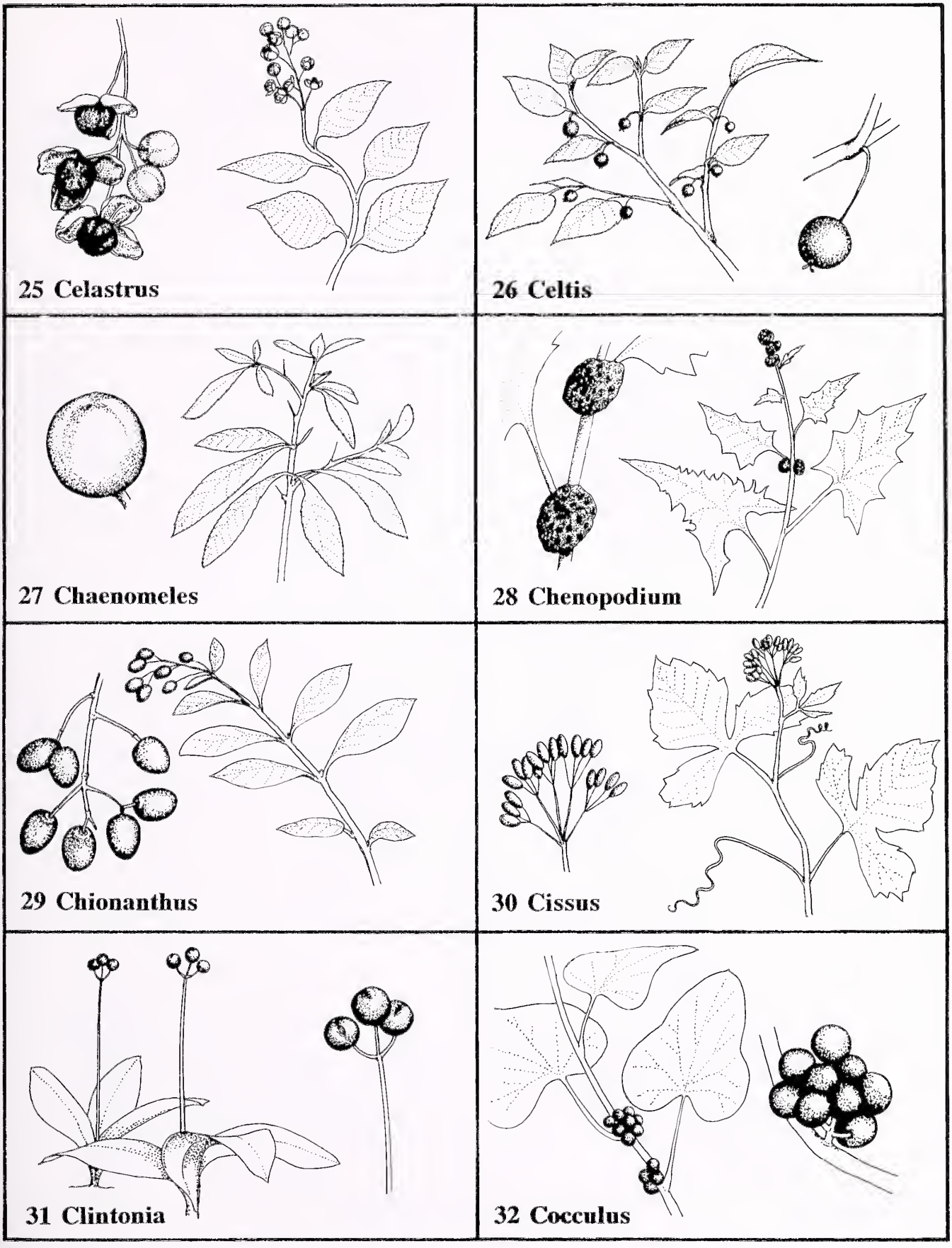
14 Belamcanda

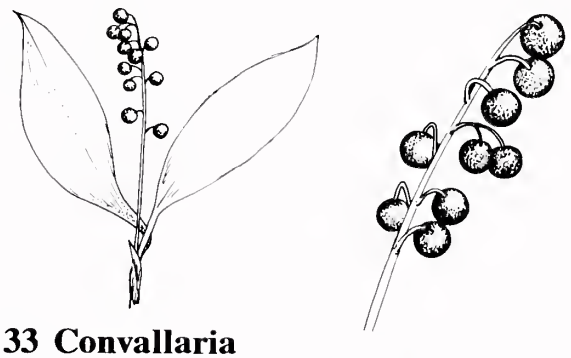
15 Berberis



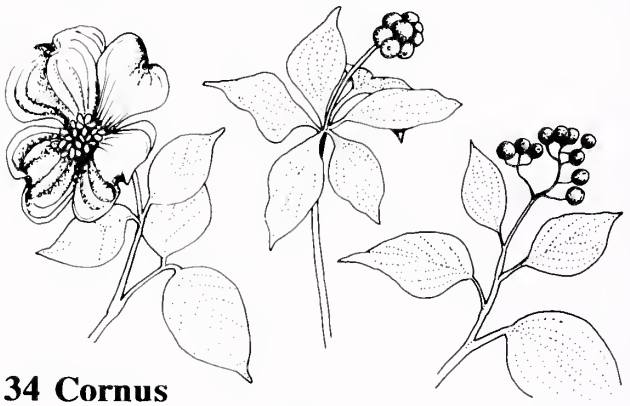
16 Berchemia


17 Broussonetia
18 Buckleya
19 Bumelia
20 Calla
21 Callicarpa
22 Calycanthus
23 Calycocarpum
24 Caulophyllum

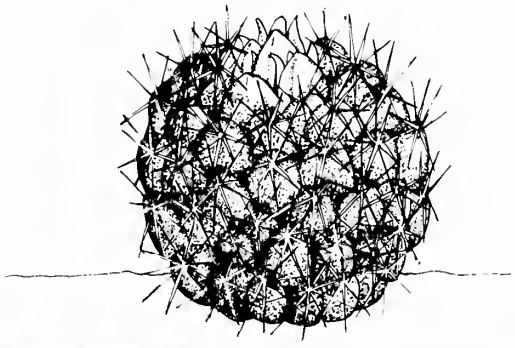

25 Celastrus
26 Celtis
27 Chaenomeles
28 Chenopodium
29 Chionanthus
30 Cissus
31 Clintonia
32 Cocculus



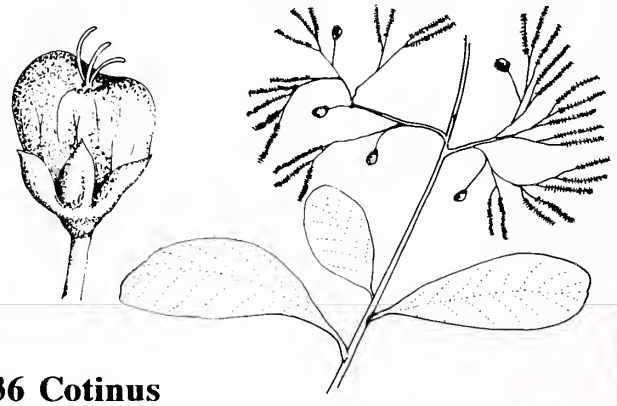
33 Convallaria



34 Cornus

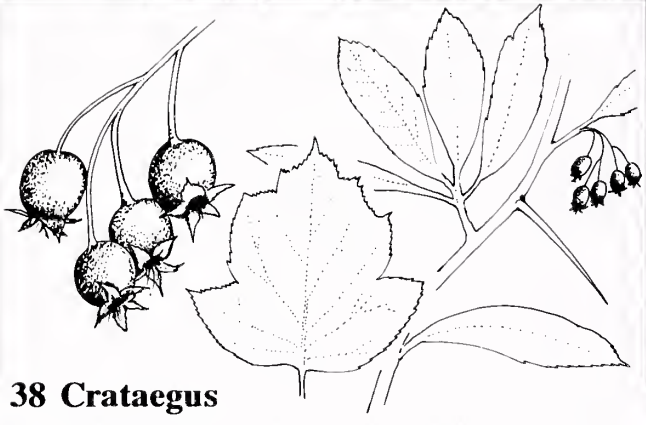


35 Coryphantha



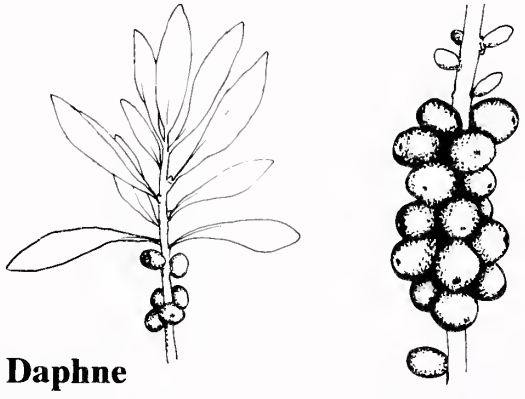
36 Cotinus

37 Cotoneaster

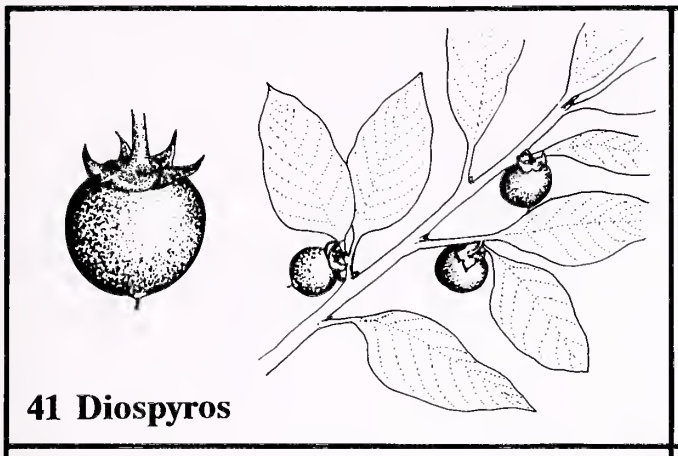


38 Crataegus

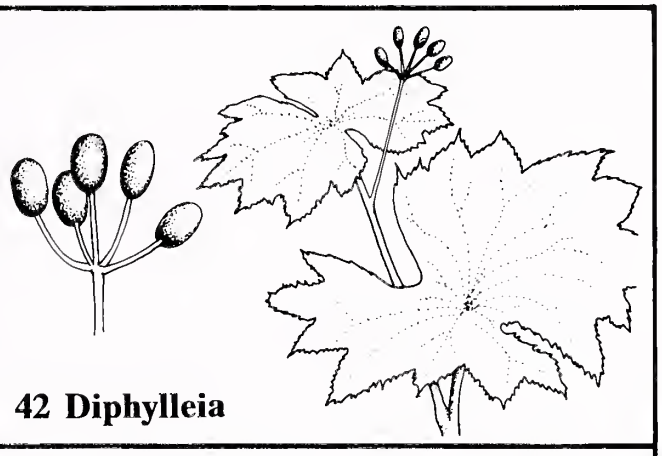
39 Cydonia



40 Daphne

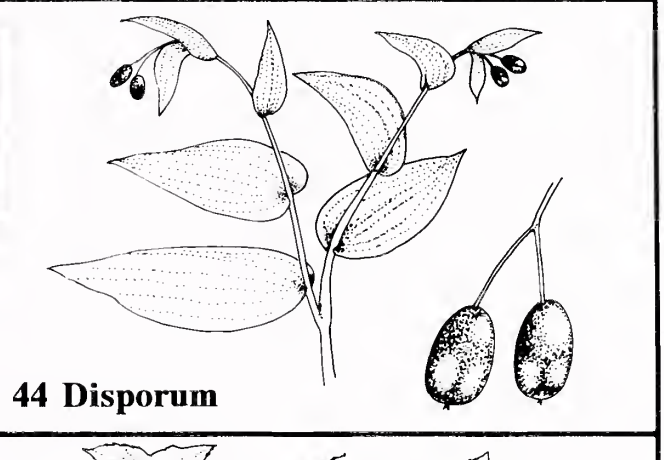


41 Diospyros

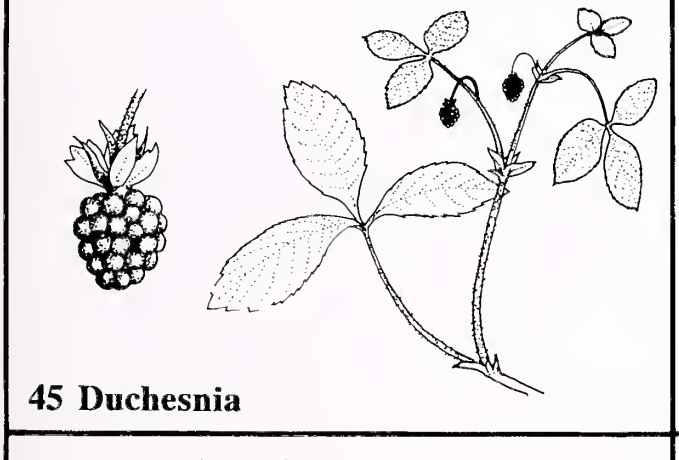


42 Diphylleia

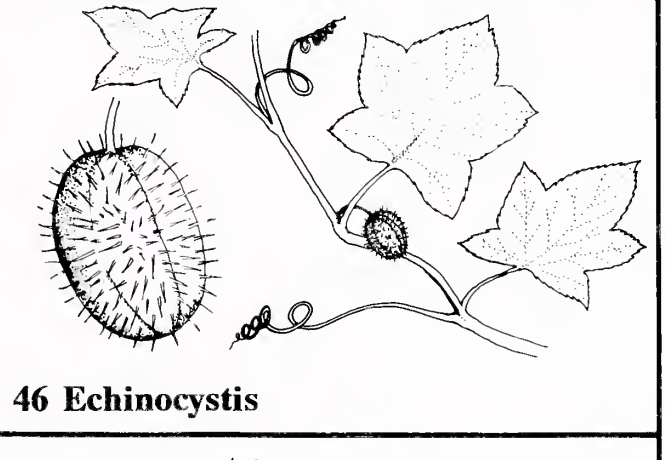
43 Dirca



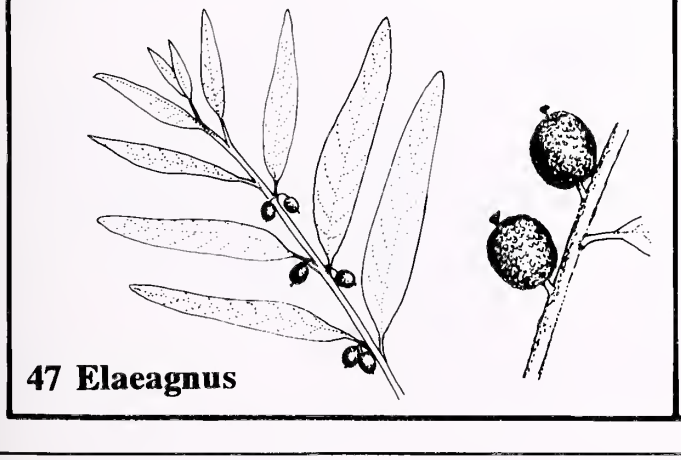
44 Disporum



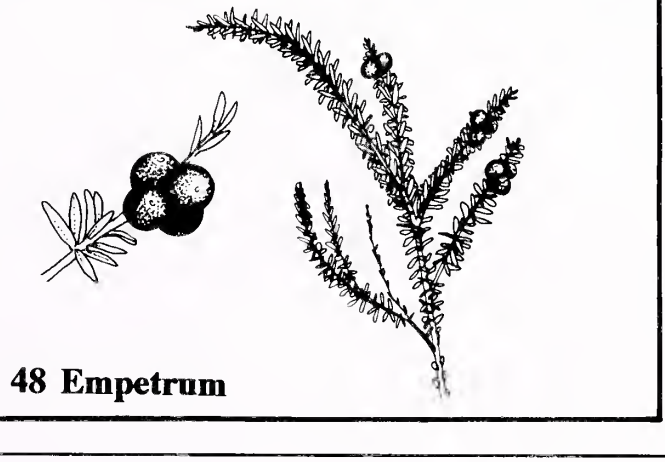
45 Duchesnia



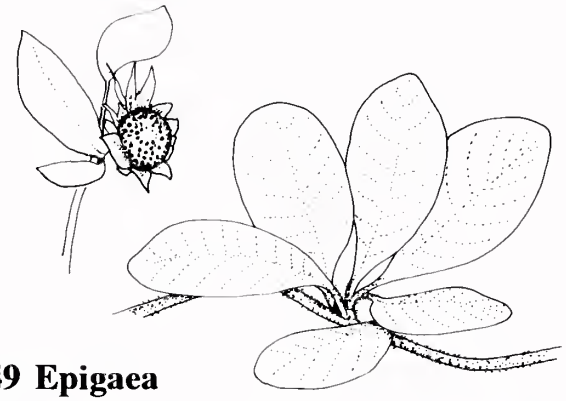
46 Echinocystis



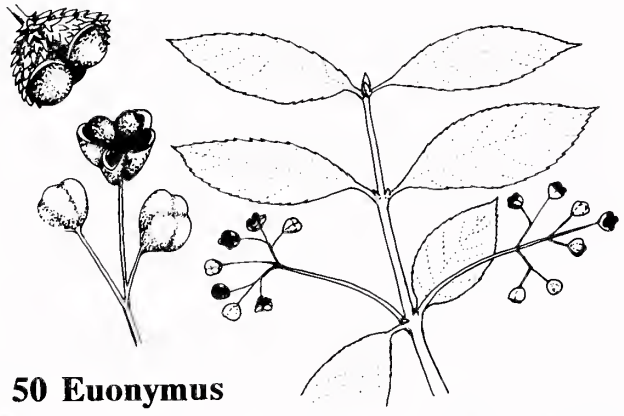
47 Elaeagnus



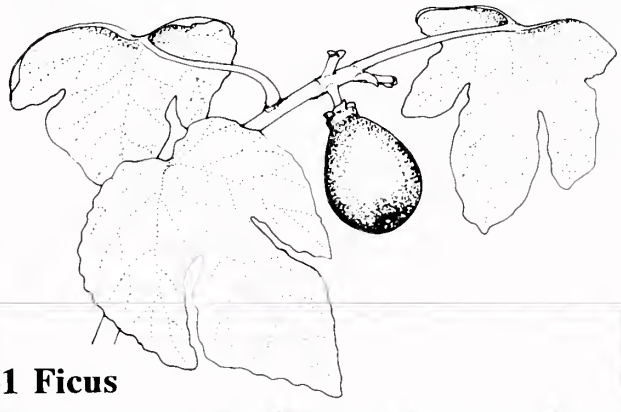
48 Empetrum



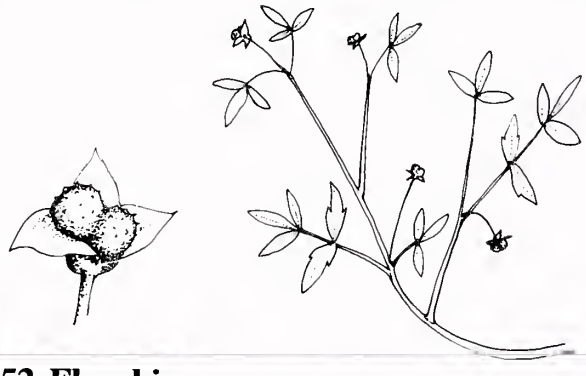
49 Epigaea



50 Euonymus

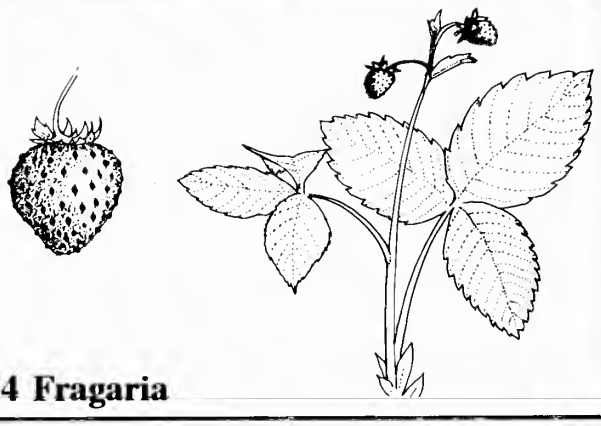


51 Ficus

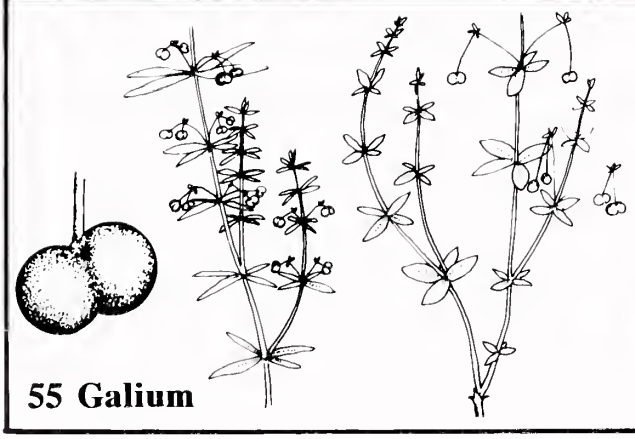


52 Floerkia

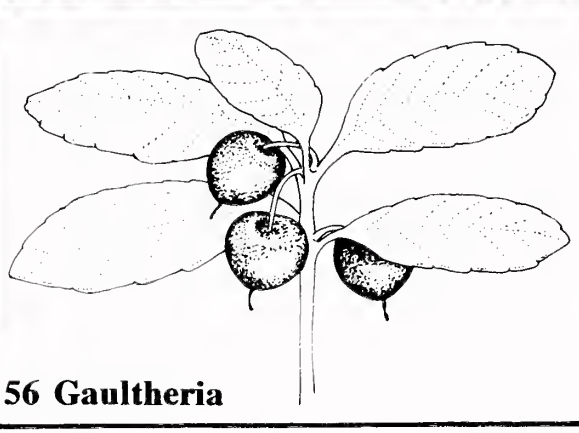
53 Forestiera



54 Fragaria

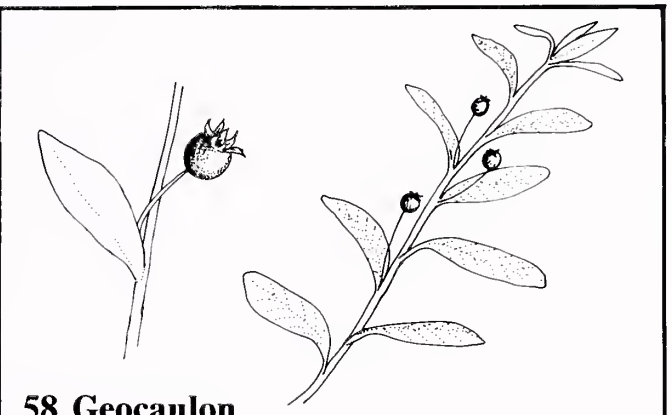


55 Galium

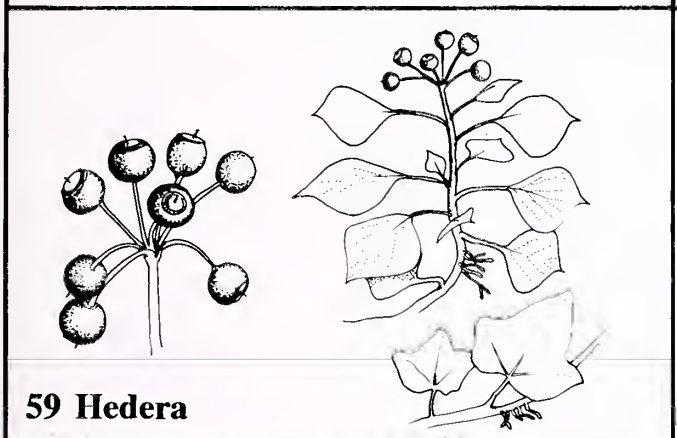


56 Gaultheria

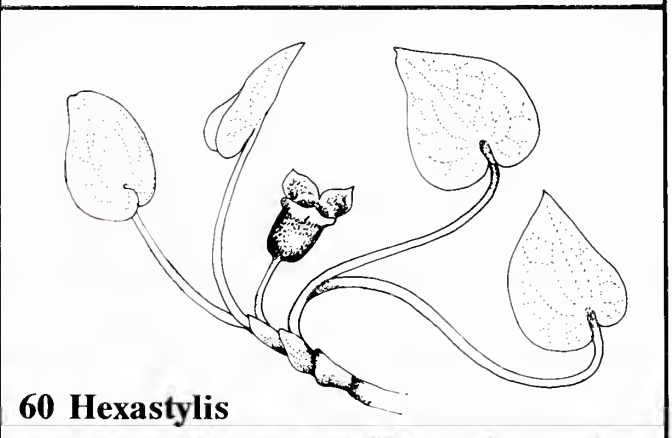
57 Gaylussacia



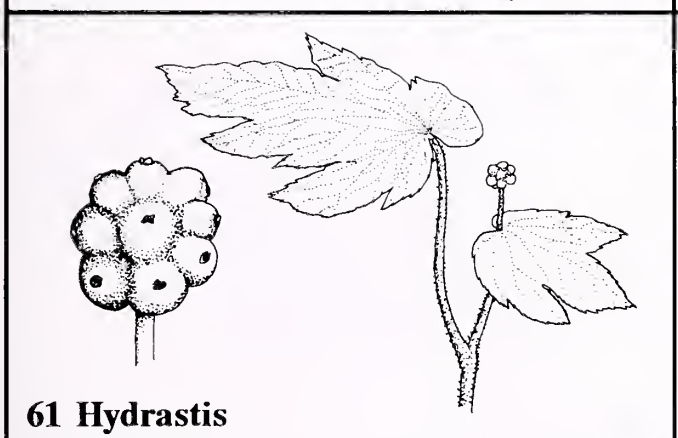
58 Geocaulon



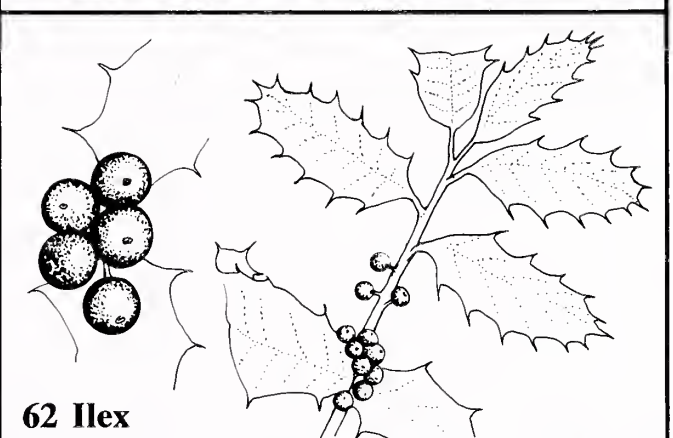
59 Hedera



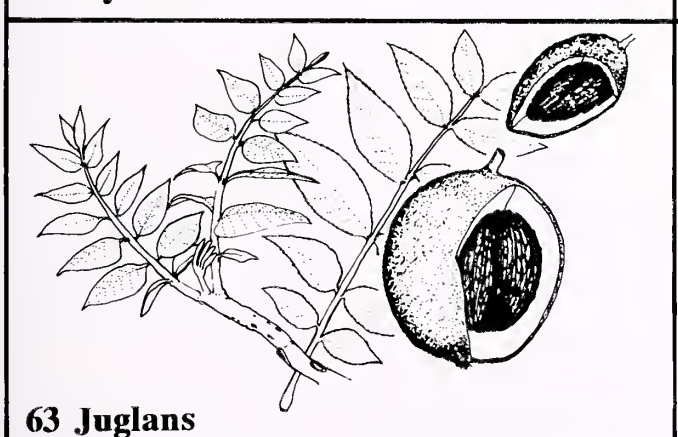
60 Hexastylis



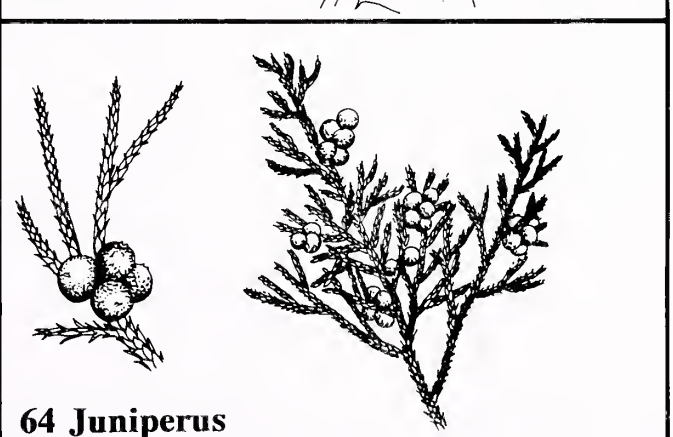
61 Hydrastis



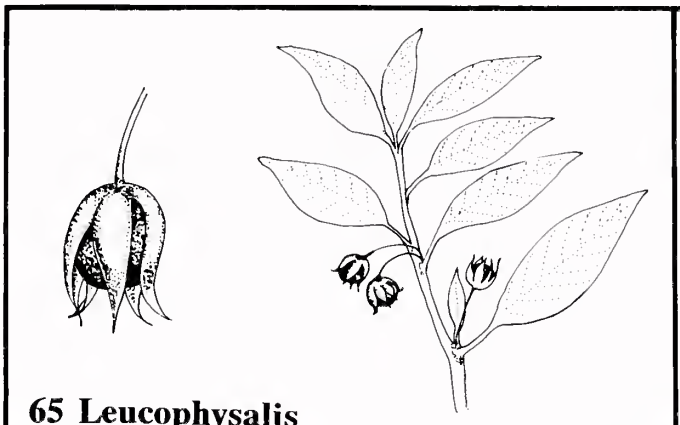
62 Ilex



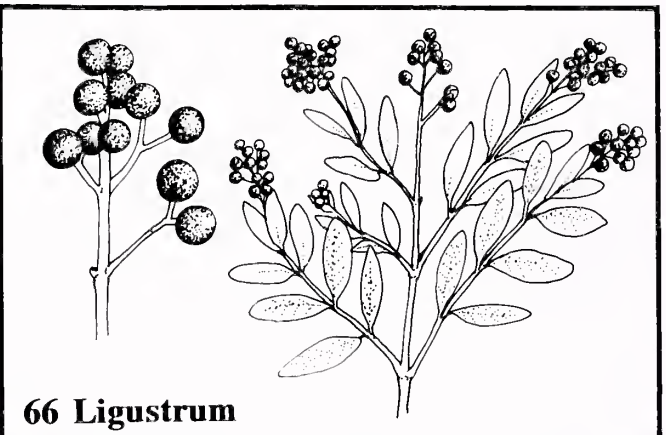
63 Juglans



64 Juniperus

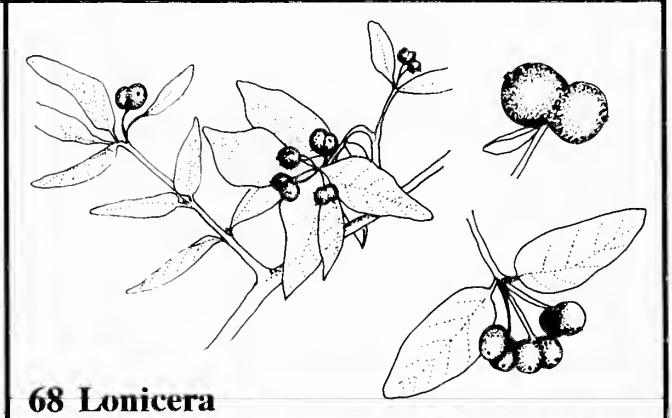


65 Leucophysalis

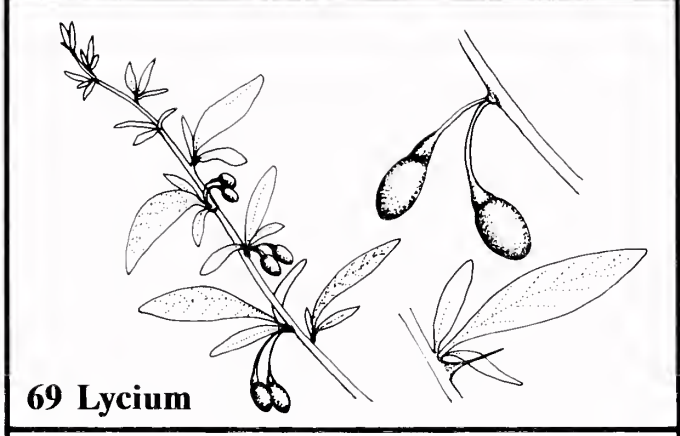


66 Ligustrum

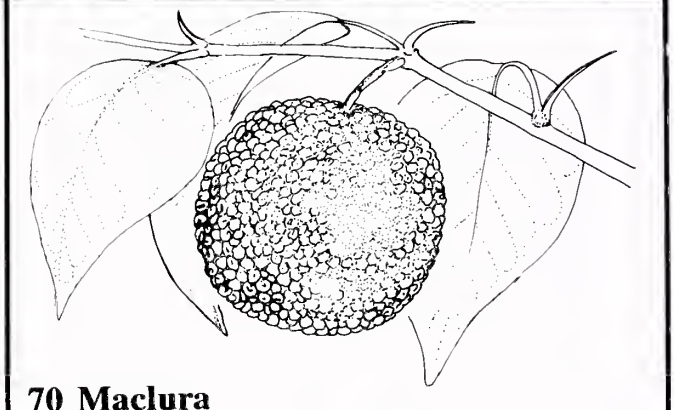
67 Lindera



68 Lonicera

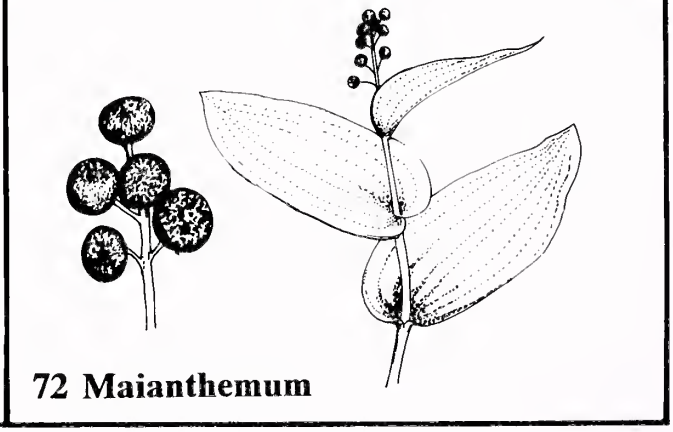


69 Lycium

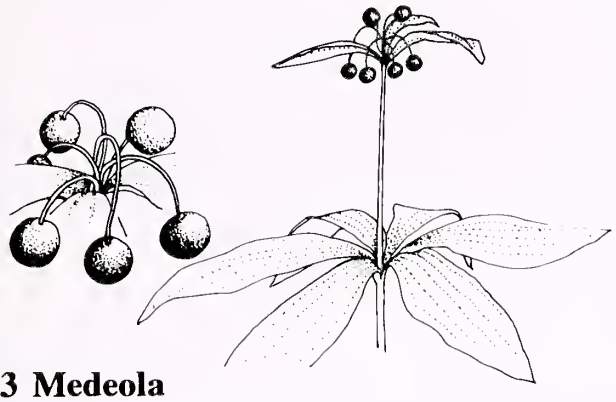


70 Maclura

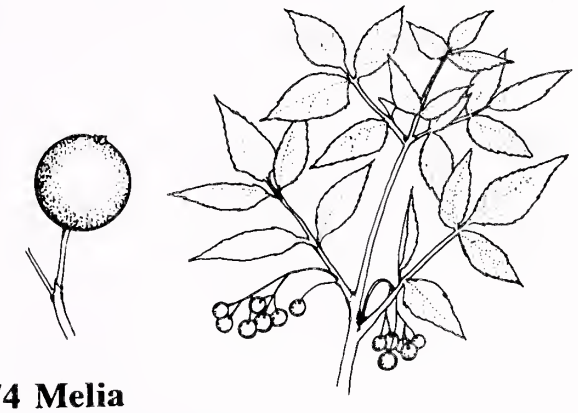
71 Magnolia



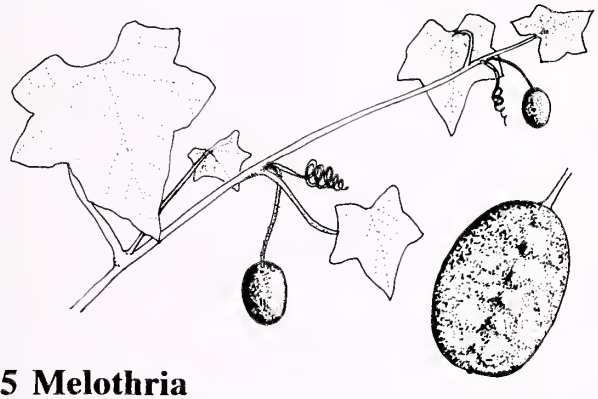
72 Maianthemum



73 Medeola

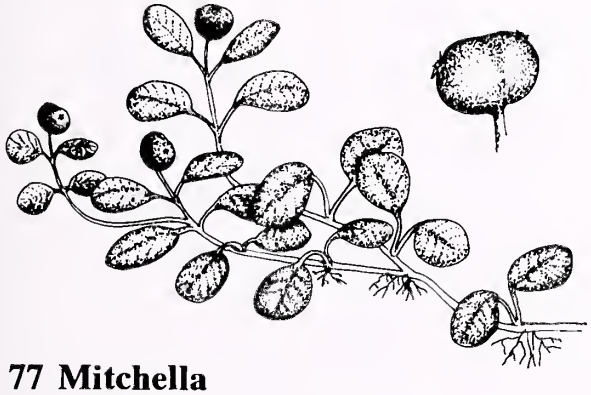


74 Melia

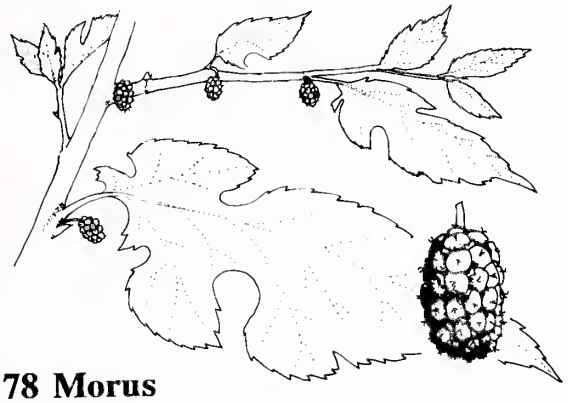


75 Melothria

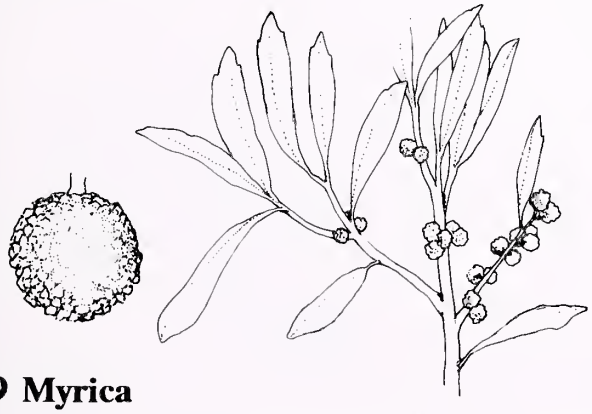
76 Menispermum



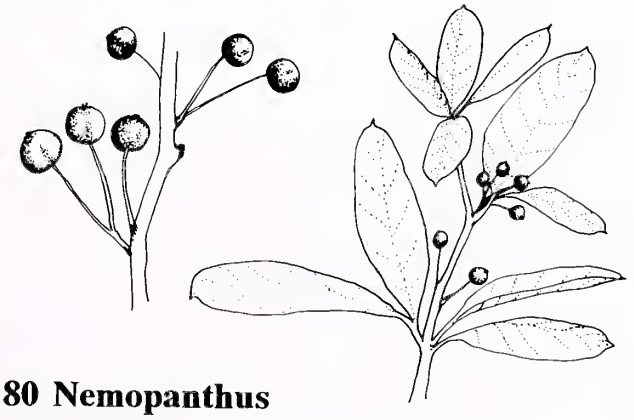
77 Mitchella



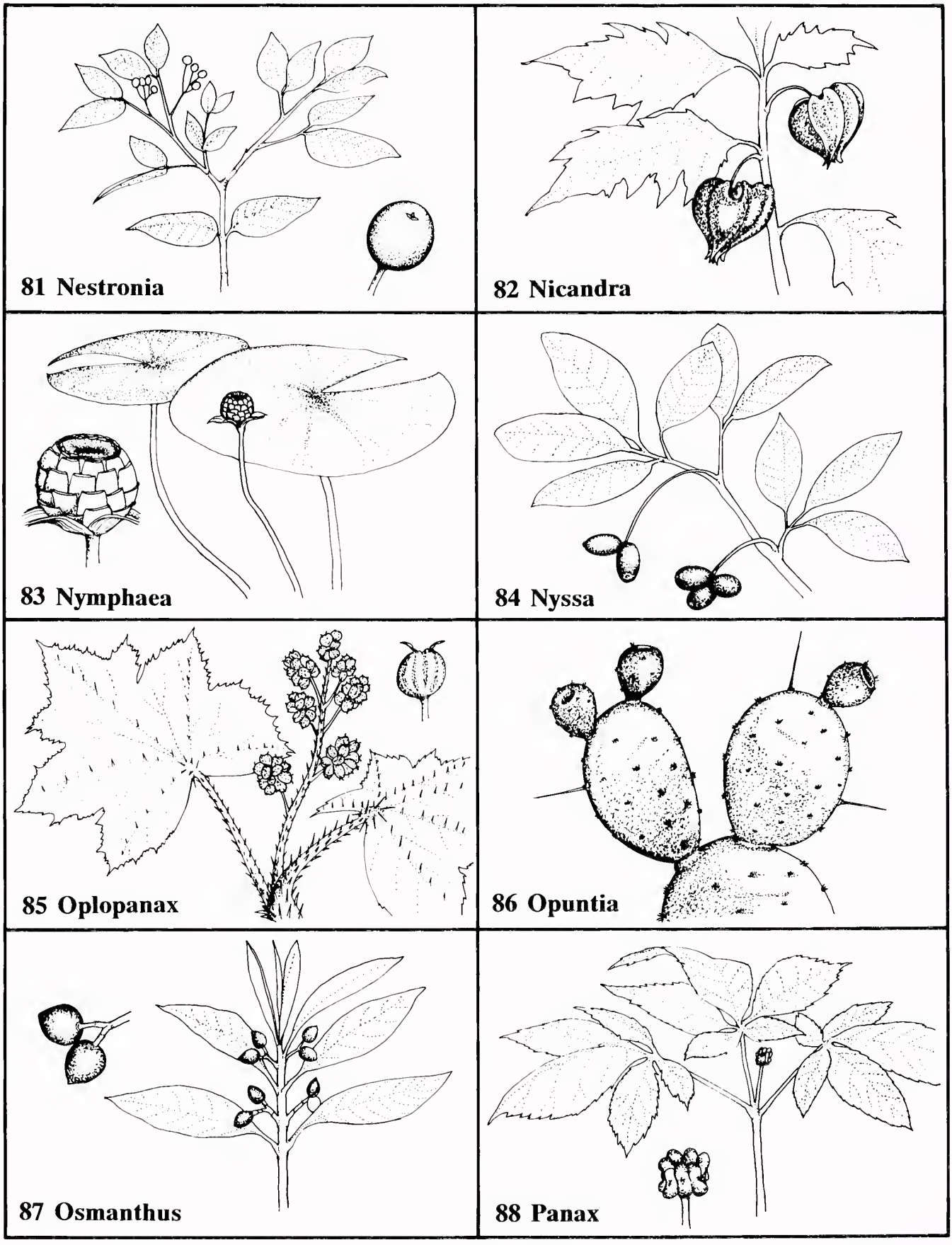
78 Morus

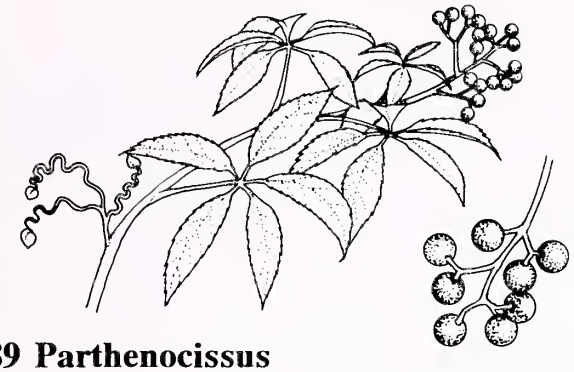


79 Myrica

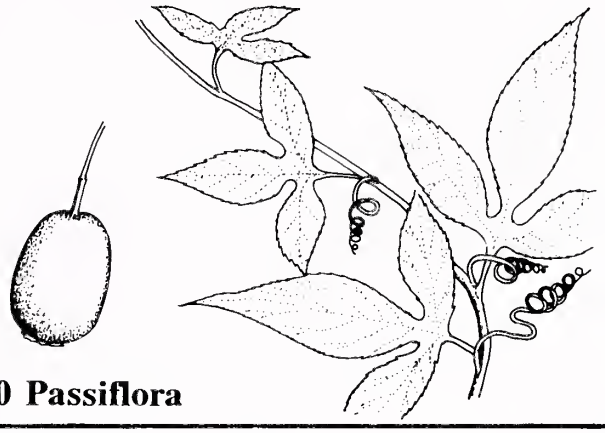


80 Nemopanthus

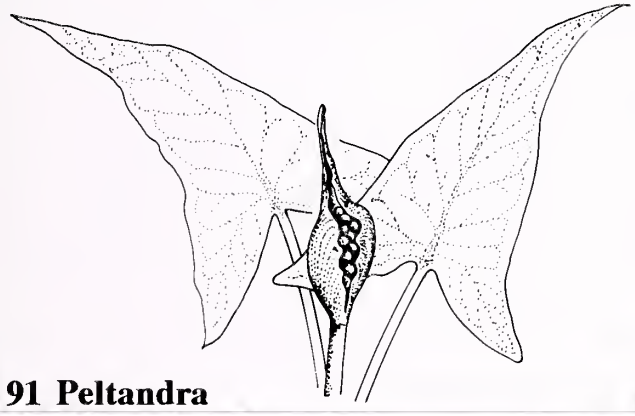

81 Nestronia
82 Nicandra
83 Nymphaea
84 Nyssa
85 Oplopanax
86 Opuntia
87 Osmanthus
88 Panax



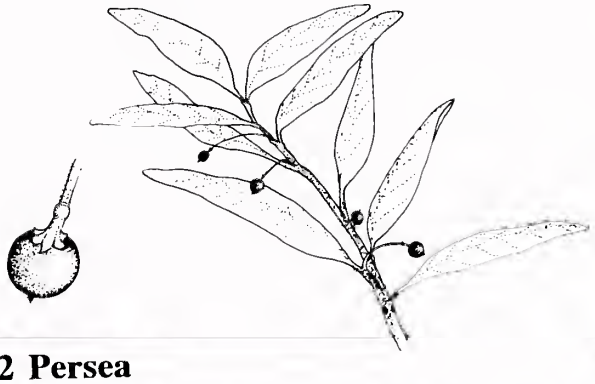
89 Parthenocissus



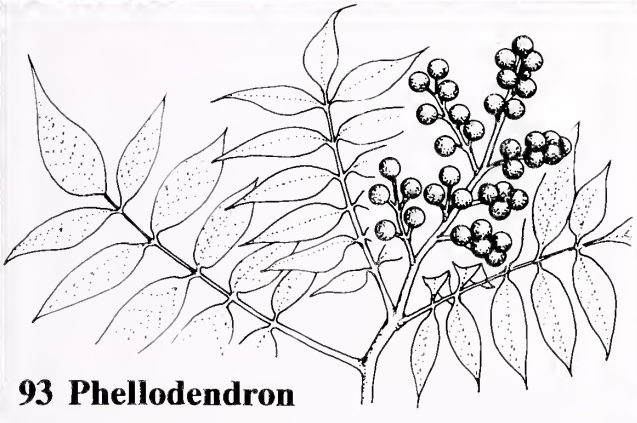
90 Passiflora



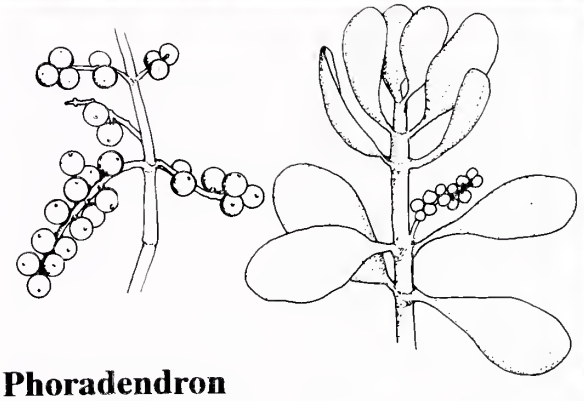
91 Peltandra



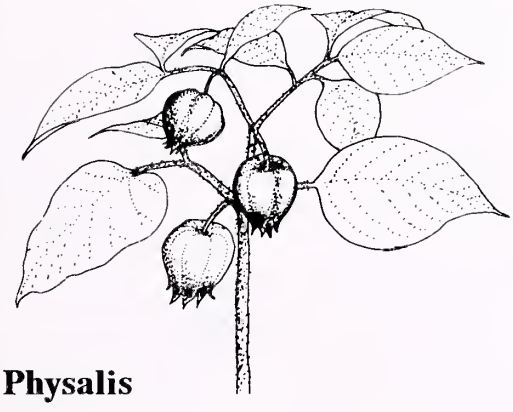
92 Persea



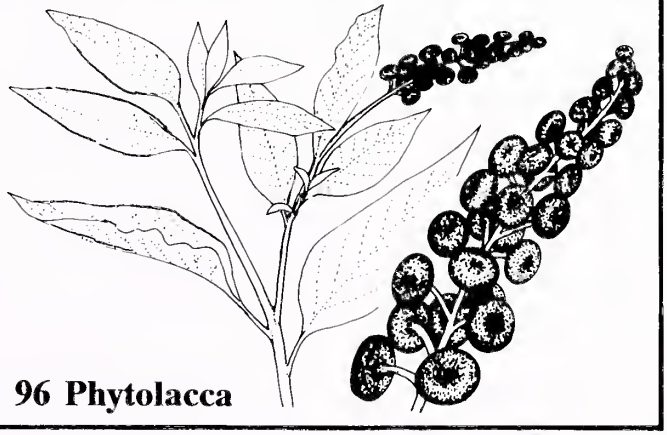
93 Phellodendron



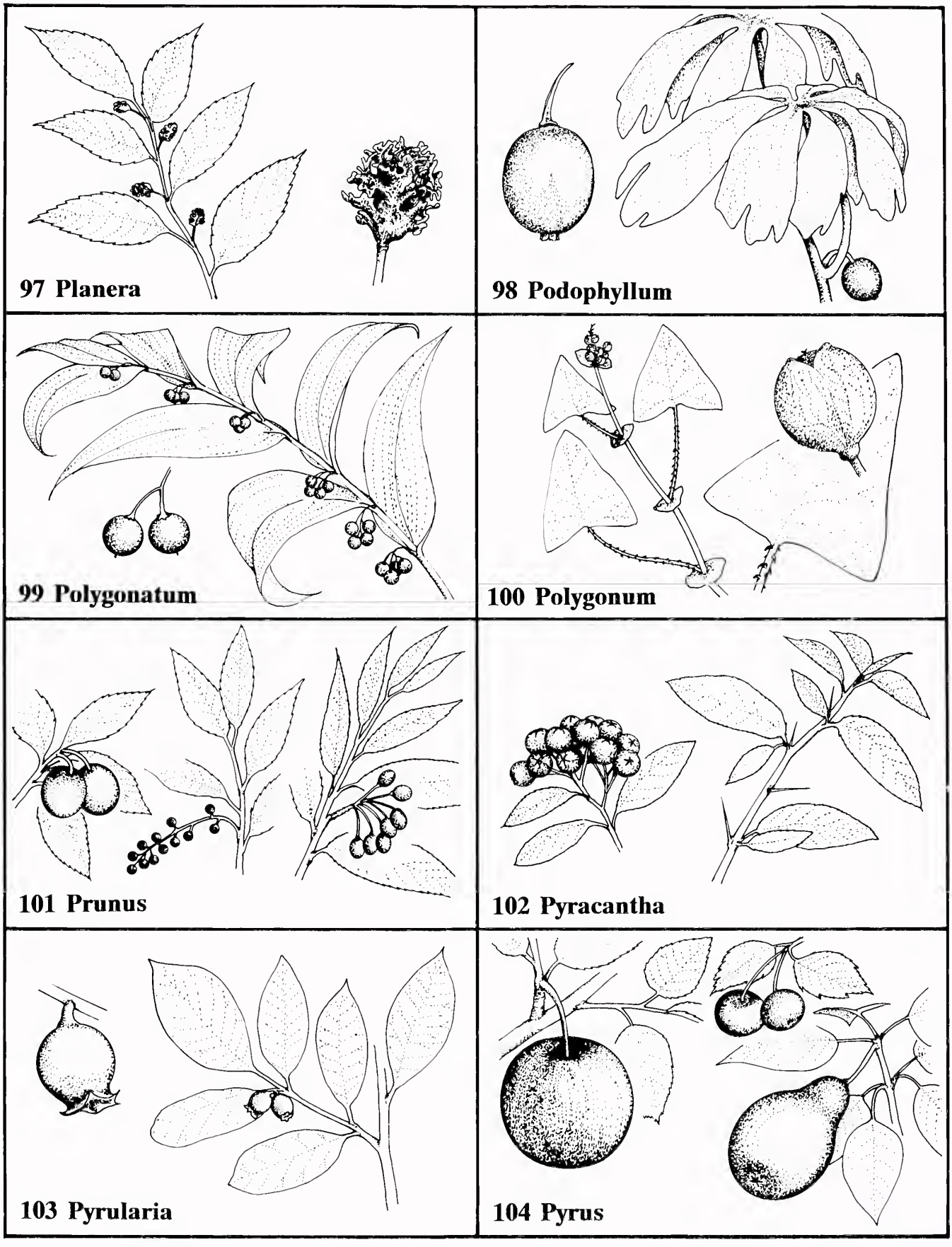
94 Phoradendron

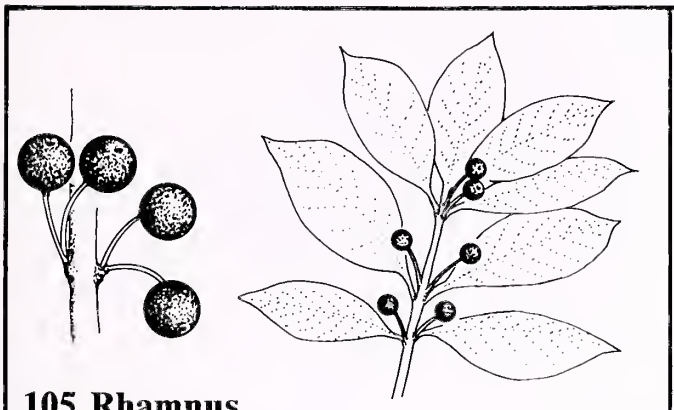


95 Physalis

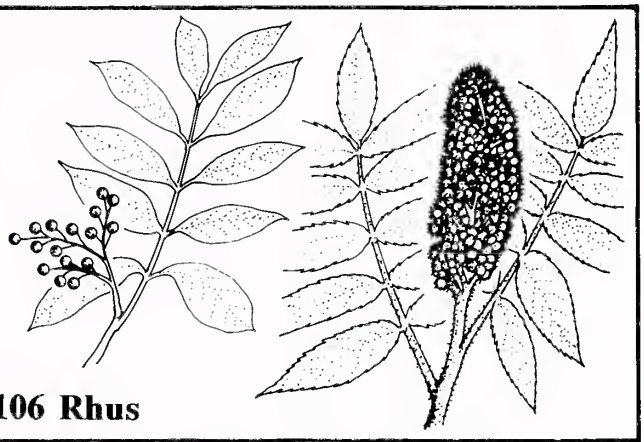


96 Phytolacca

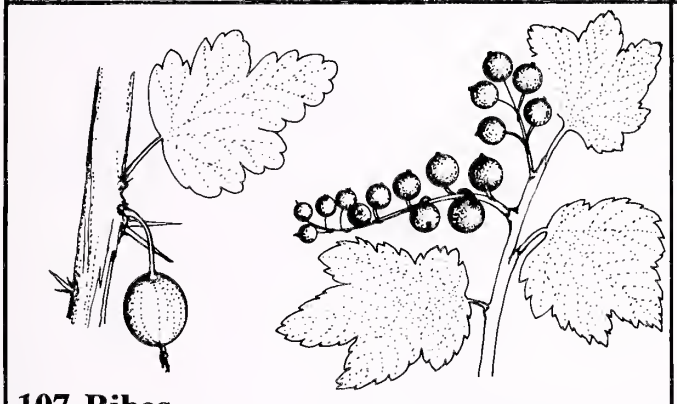

97 Planera
98 Podophyllum
99 Polygonatum
100 Polygonum
101 Prunus
102 Pyracantha
103 Pyrularia
104 Pyrus



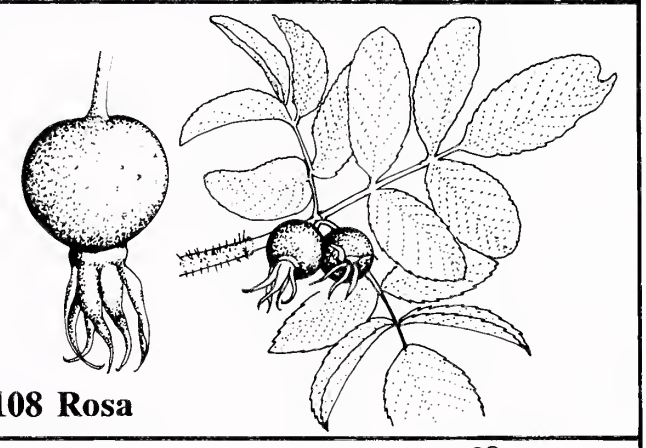
105 Rhamnus



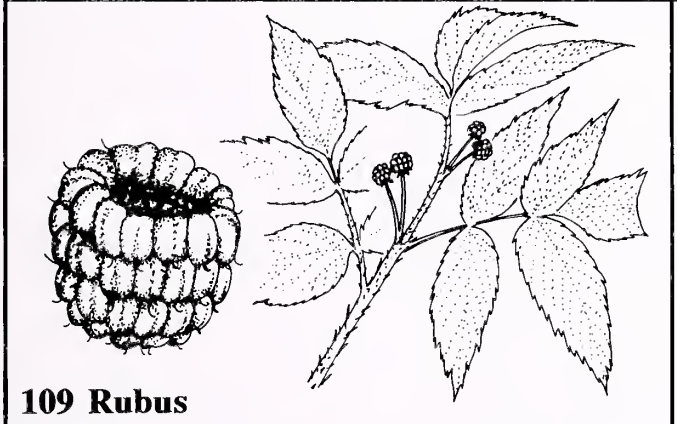
106 Rhus



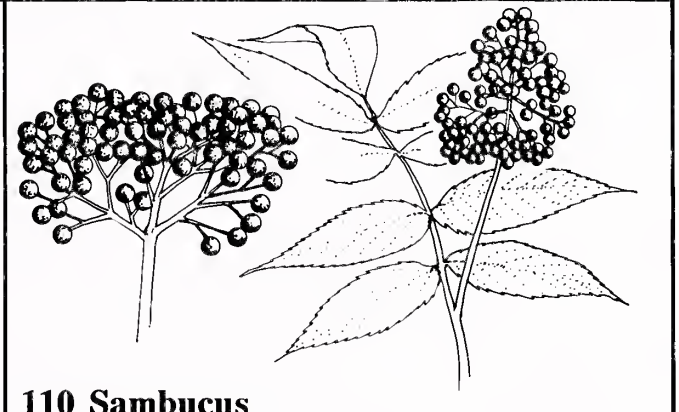
107 Ribes



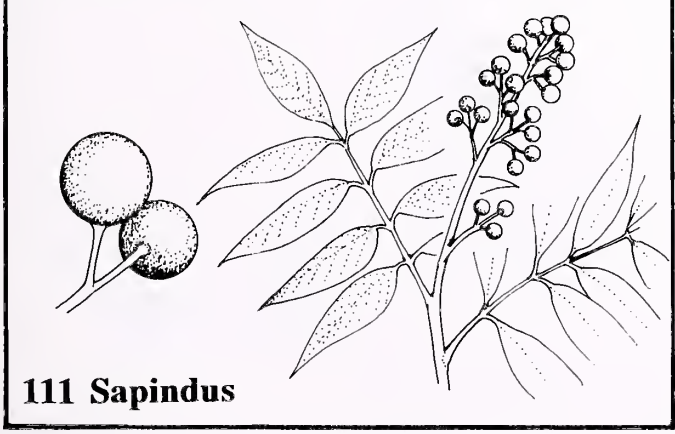
108 Rosa



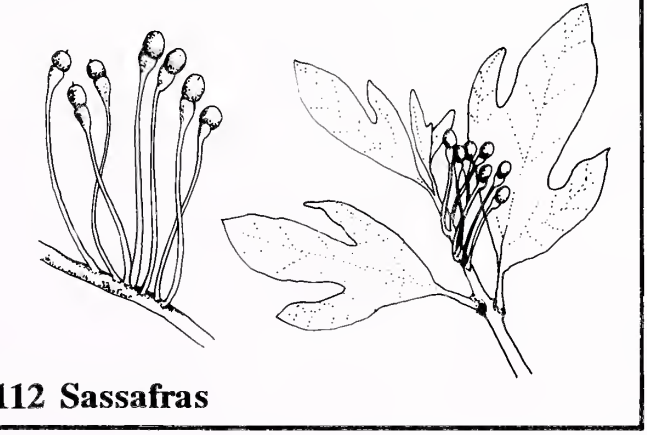
109 Rubus



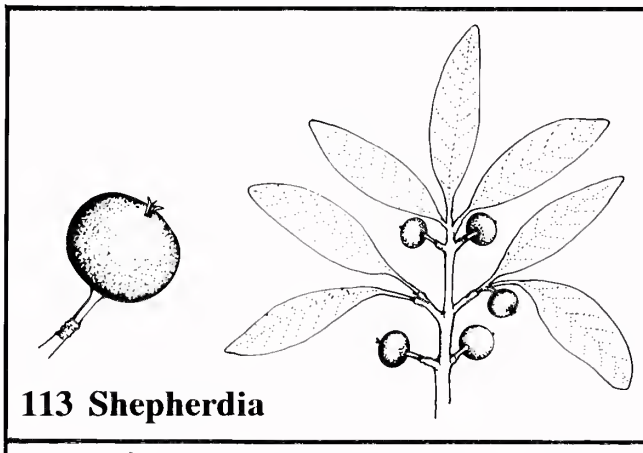
110 Sambucus



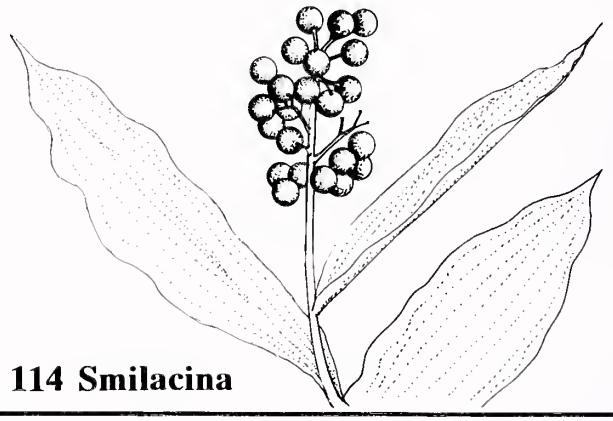
111 Sapindus



112 Sassafras



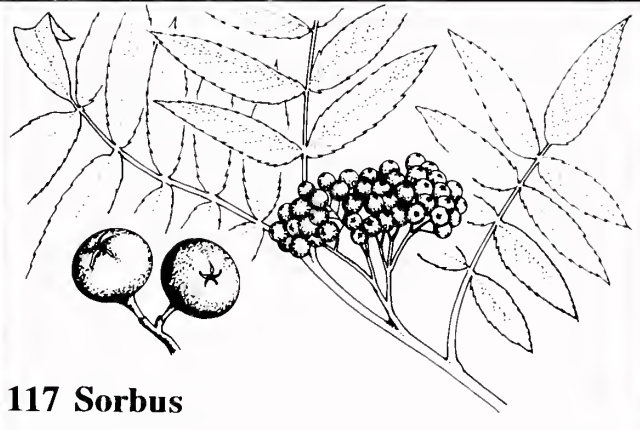
113 Shepherdia



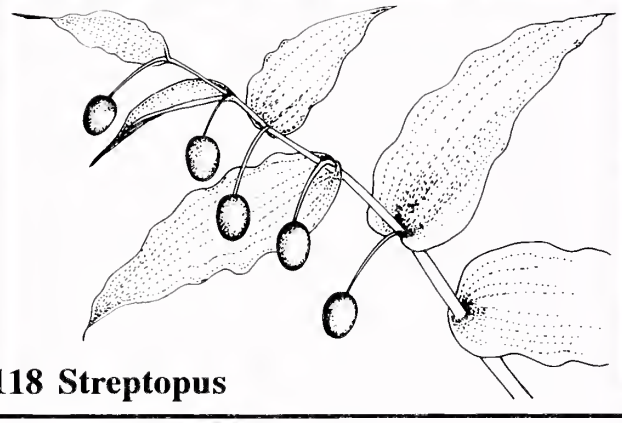
114 Smilacina

115 Smilax

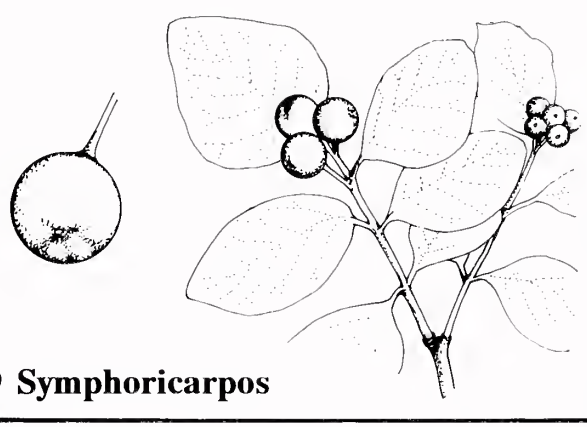
116 Solanum



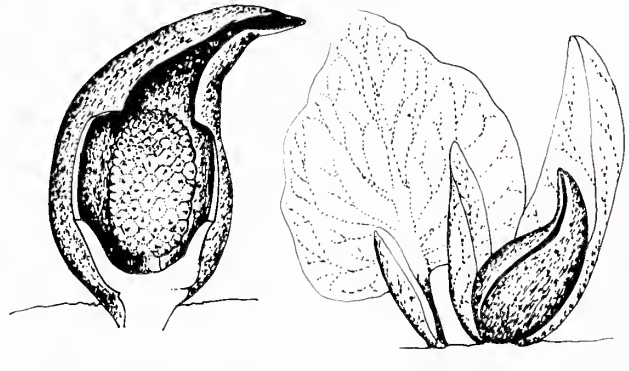
117 Sorbus



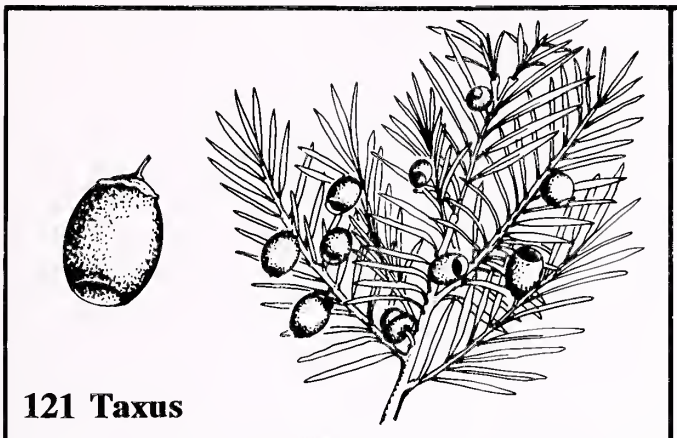
118 Streptopus



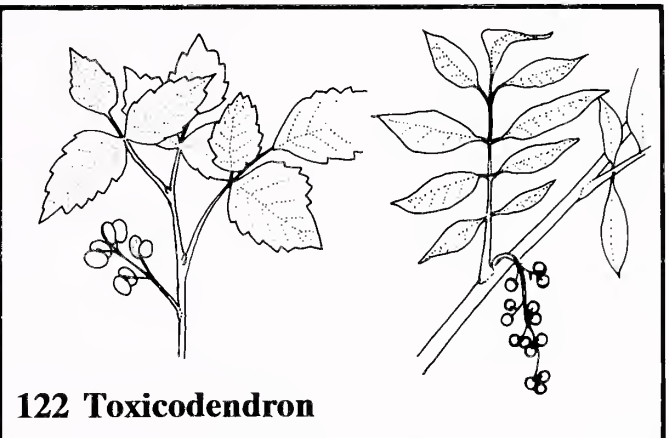
119 Symphoricarpos



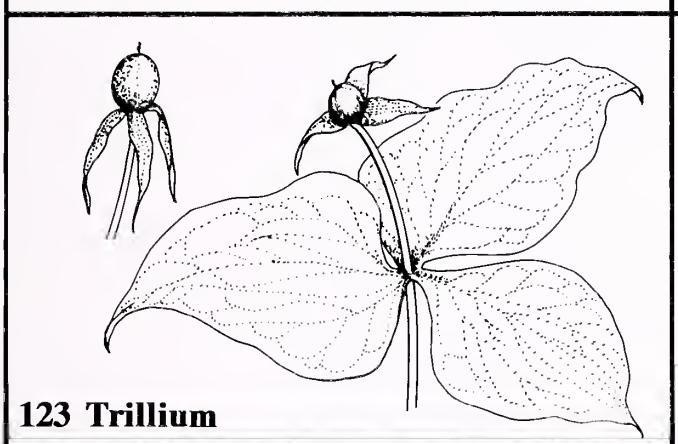
120 Symplocarpus



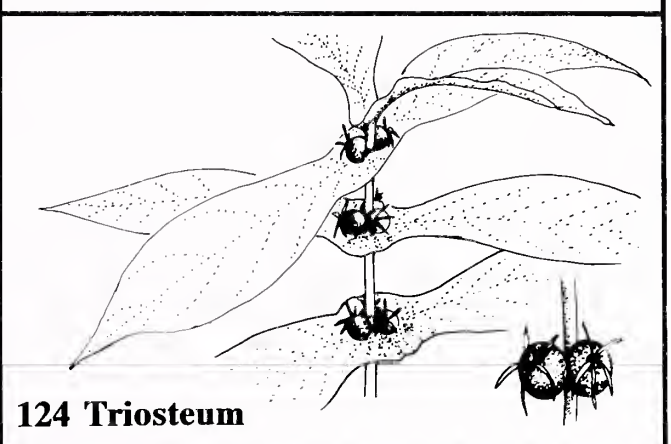
121 Taxus



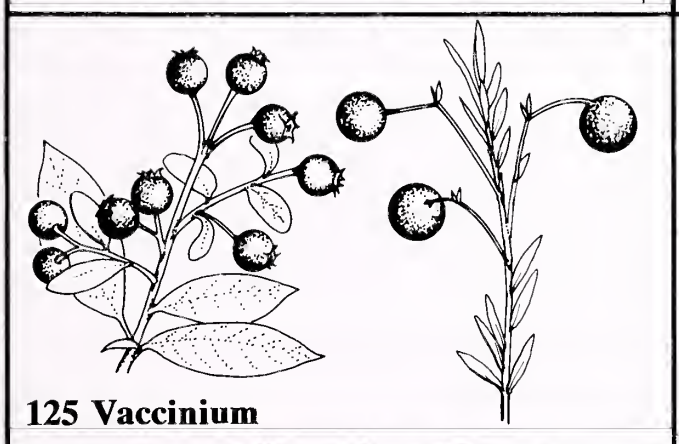
122 Toxicodendron



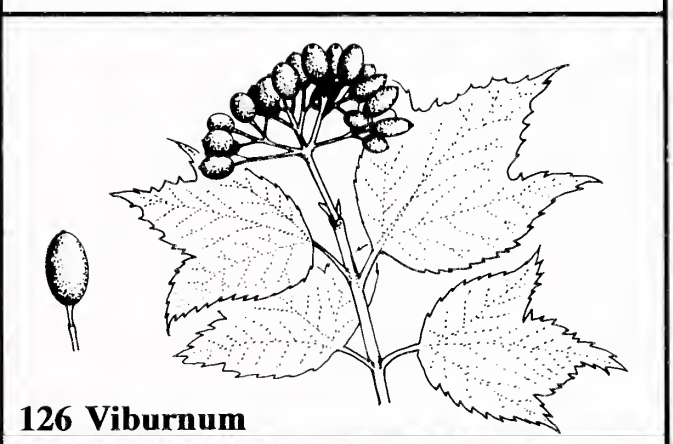
123 Trillium



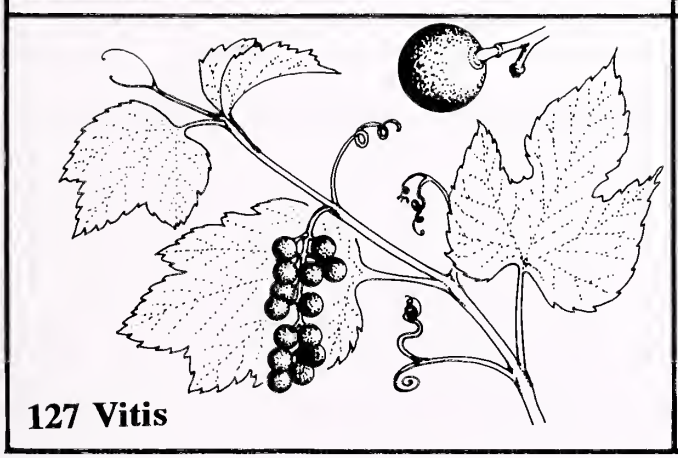
124 Triosteum



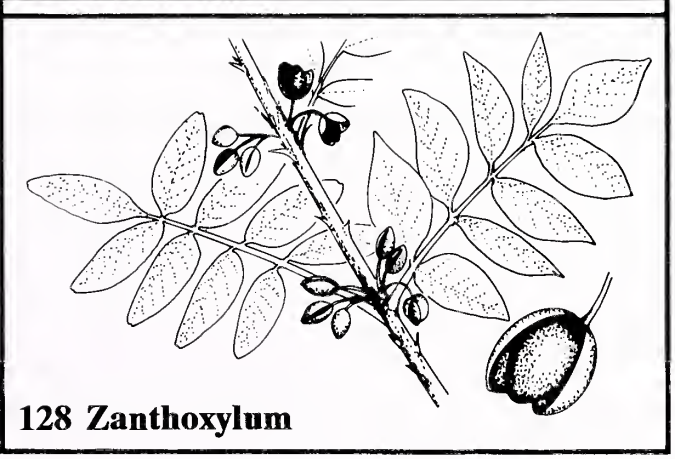
125 Vaccinium



126 Viburnum



127 Vitis



128 Zanthoxylum

USING THE SEQUENTIAL KEY

This branching key provides the user with a sequence of paired descriptions to be compared with the specimen to be identified. Each pair of choices offers opposing characters, *one* of which is to be selected as best describing the plant. At the end of the line chosen, a number indicates the next pair of choices to be considered. Proceed in this way until the name of a genus of plants appears at the end of the line rather than a number. Then consult the illustrations (pp. 50-65) and the listing of Genera of Plants with Fleshy Fruits (pp. 77-79) for confirmation and further information. A major drawback of the sequential key is that lack of knowledge about a single character can impede the identification process, so this type of key may be used effectively only when stems, leaves, fruits, seeds and other parts of the plant are available. Characters for this key were chosen which would be visible at the time of fruiting rather than flowering.

SEQUENTIAL KEY TO PLANTS WITH FLESHY FRUITS

1. Plants thick and pulpy, usually spiny (cacti)...**95**
1. Plants not thick and pulpy...**2**
  2. Stems woody...**96**
  2. Stems not woody...**3**
3. Leaves compound...**81**
3. Leaves simple...**4**
  4. Leaves basal, whorled or alternate...**11**
  4. Leaves opposite...**5**
5. Plants creeping; seeds 4-8; fruits paired...**Mitchella**
5. Plants not creeping; seeds fewer than 4 *or* 10 or more; fruits not paired...**6**
  6. Plants with fewer than 4 leaves...**7**
  6. Plants with more than 4 leaves...**8**
7. Seeds fewer than 10 per fruit...**Convallaria**
7. Seeds more than 10 per fruit...**Podophyllum**
  8. Fruits with 1 or 2 seeds...**Cornus**
  8. Fruits with more than 2 seeds...**9**
9. Fruits 3-seeded...**Triosteum**
9. Fruits with many seeds...**10**
  10. Fruits yellow, each borne in a husk...**Leucophysalis** (also see **Physalis**)
  10. Fruits black, not in husks...**Atropa**
11. Leaves whorled or basal...**12**
11. Leaves alternate...**26**
  12. Leaves whorled...**13**
  12. Leaves basal...**18**
13. Plants with 1 or 2 whorls of leaves...**14**
13. Plants with many whorls of leaves...**17**
  14. Plants with 1 whorl of leaves...**15**
  14. Plants with 2 whorls of leaves...**Medeola**

15. Fruits borne on an erect stalk from near ground level...**Convallaria**
15. Fruits borne from a whorl of leaves, not stalked or on a very short or drooping stalk...**16**
16. Leaves 3 per whorl...**Trillium**
16. Leaves more than 3 per whorl...**Cornus**
17. Fruits red...**Asparagus**
17. Fruits blue, purple or black...**Galium**
18. Fruits red...**19**
18. Fruits not red...**21**
19. Leaf blades as wide or wider than long...**20**
19. Leaf blades considerably longer than wide...**Convallaria**
20. Leaves with teeth and deep lobes...**Hydrastis**
20. Leaves without teeth...**Calla**
21. Plants with a skunklike odor; fruit cluster pale, oblong to nearly spherical with embedded seeds...**Symplocarpus**
21. Plants without a skunklike odor; fruits not as above...**22**
22. Flowers borne at the water surface with floating (lily-pad) leaves; fruits coiled within their long stalks under water at maturity...**Nymphaea**
22. Flowers and leaves usually not floating; fruits not coiled...**23**
23. Fruit cluster borne within a long sheath with a beak-like tip; leaves numerous, narrowly arrowhead-shaped...**Peltandra**
23. Fruits not borne within a sheath; leaves not as above...**24**
24. Leaves shiny, straplike, clustered at the base of the flower or fruit stalk; veins parallel...**Clintonia**
24. Leaves broad, net-veined with stalks (petioles)...**25**
25. Plants with two, soft hairy leaves...**Asarum**
25. Plants with several smooth leaves...**Hexastylis**
26. Leaves with teeth...**27**
26. Leaves without teeth...**41**
27. Plants creeping or climbing...**28**
27. Plants not creeping or climbing...**33**
28. Leaves lobed...**29**
28. Leaves not lobed...**32**
29. Fruits red when mature...**Solanum**
29. Fruits not red...**30**
30. Fruits with 4 seeds...**Echinocystis**
30. Fruits with more than 5 seeds...**31**
31. Leaves mostly 3-lobed...**Passiflora**
31. Leaves mostly 5-lobed...**Melothria**
32. Plants creeping; fruits white...**Gaultheria**
32. Plants climbing; fruits red or green...**Solanum**
33. Fruits not enclosed in husks...**36**
33. Fruits enclosed in husks...**34**
34. Husks with spines...**Solanum**
34. Husks without spines...**35**
35. Husks split halfway or more to the base...**Nicandra**
35. Husks split only at the apex...**Physalis**
36. Fruits blue; leaf single, large, umbrella-like...**Diphylleia**
36. Fruits not blue; leaves various...**37**
37. Fruits red...**38**
37. Fruits yellow, green or black...**Solanum**
38. Fruitlets in a compact cluster as in blackberries...**Rubus**
38. Fruits not densely clustered heads of fruitlets...**39**

39. Leaves with tiny teeth; plants with wintergreen odor when crushed; fruits with floral remnants at apex...**Gaultheria**
39. Leaves with coarse teeth; plants without wintergreen odor...**40**
40. Leaves triangular, shallowly lobed; fruits in the leaf axils or borne laterally on a leafless stem...**Chenopodium**
40. Leaves not triangular, deeply lobed; fruits borne as a single cluster of red berries at the plant apex...**Hydrastis**
41. Fruits white, orange or red...**42**
41. Fruits not white, orange or red...**55**
42. Seeds 1 or 2 per fruit...**43**
42. Seeds more than 2 per fruit...**47**
43. Plants with tendrils...**Smilax**
43. Plants without tendrils...**44**
44. Fruits with floral remnants at apex, with 1 seed...**Geocaulon**
44. Fruits without floral remnants at apex, with 1 or 2 seeds...**45**
45. Plants usually bearing 3 or more leaves; leaves 6-15 cm long...**Smilacina**
45. Plants with 1-3 (usually 2) leaves; leaves 3-10 cm long...**46**
46. Plants with purplish-red fruits, often mottled with green...**Maianthemum**
46. Plants with red to orange fruits...**Convallaria**
47. Fruits with more than 10 seeds...**50**
47. Fruits with fewer than 10 seeds...**48**
48. Fruits with floral remnants at apex...**Gaultheria**
48. Fruits without floral remnants at apex...**49**
49. Plants with fewer than 5 leaves...**Convallaria**
49. Plants with more than 5 leaves...**Disporum**
50. Fruits enclosed within husks...**51**
50. Fruits not enclosed within husks...**52**
51. Husks with spines...**Solanum**
51. Husks without spines...**Physalis**
52. Plants climbing...**Solanum**
52. Plants not climbing...**53**
53. Leaves triangular, with long stalks...**Chenopodium**
53. Leaves not triangular, stalks absent or short...**54**
54. Leaf stalks absent...**Streptopus**
54. Leaf stalks short but present...**Gaultheria**
55. Fruits yellow...**56**
55. Fruits not yellow...**62**
56. Plants climbing or creeping...**57**
56. Plants not climbing or creeping...**59**
57. Plants with spines...**Solanum**
57. Plants without spines...**58**
58. Leaves with 3 broad, shallow lobes; fruits about 5-6 cm long...**Passiflora**
58. Leaves with 3-7, narrow, very deep lobes (appearing to be compound); fruits less than 1 cm long...**Floerkea**
59. Seeds 3-6 per fruit...**Disporum**
59. Seeds more than 10 per fruit...**60**
60. Plants with spines...**Solanum**
60. Plants without spines...**61**
61. Fruits loosely enclosed in 5-angled husks...**Physalis**
61. Fruits tightly enclosed within scarcely-angled husks...**Leucophysalis**
62. Fruits blue, brown or purple...**63**
62. Fruits green or black...**68**
63. Fruits blue...**64**
63. Fruits brown or purple...**66**

64. Plants not climbing; without spines...**Polygonatum**
64. Plants climbing; with spines...**65**
65. Leaves triangular in outline; fruits less than 0.5 cm long...**Polygonum**
65. Leaves heart-shaped or oval but not triangular; fruits more than 0.5 cm long...**Smilax**
66. Fruits with 1 seed...**Polygonum**
66. Fruits with more than 1 seed...**67**
67. Fruits with a hollow to pithy, central chamber...**Passiflora**
67. Fruits without a soft, central chamber...**68**
68. Fruits less than 1 cm long...**69**
68. Fruits more than 1 cm long...**72**
69. Plants delicate, creeping; leaves deeply lobed...**Floerkea**
69. Plants robust, erect or spreading, not creeping; leaves unlobed...**70**
70. Plants climbing or twining on themselves by tendrils...**Smilax**
70. Plants not climbing or twining by tendrils...**71**
71. Fruits few, dangling on slender stalks attached at leaf bases; leaves with roughly parallel veins...**Polygonatum**
71. Fruits numerous, borne in robust spikes at the branch tips; leaves with veins branching from a strong midvein...**Phytolacca**
72. Plants climbing or sprawling...**73**
72. Plants not climbing...**75**
73. Plants with tendrils...**74**
73. Plants without tendrils; fruits green...**Solanum**
74. Fruits black, with 1-6 seeds; plants with or without spines...**Smilax**
74. Fruits green or yellow (to purple-tinged), with more than 10 seeds; plants never spiny...**Passiflora**
75. Fruits green...**76**
75. Fruits black...**77**
76. Fruits enclosed in husks...**Physalis**
76. Fruits not enclosed in husks...**Phytolacca**
77. Fruit cluster dense, more than 2 cm long...**Belamcanda**
77. Fruits less than 2 cm long; loosely clustered, if at all...**78**
78. Leaves without stalks, blades with roughly parallel veins...**Polygonatum**
78. Leaves with stalks, blades with net veins...**79**
79. Fruits somewhat compressed, wider than long...**Phytolacca**
79. Fruits spherical, about as long as wide...**80**
80. Fruits borne singly in the axils of the leaves...**Atropa**
80. Fruits borne in loose clusters...**Solanum**
81. Leaves alternate...**86**
81. Leaves opposite, whorled or basal...**82**
82. Leaves opposite, with 5-9 leaflets...**Sambucus**
82. Leaves whorled or basal...**83**
83. Fruits yellow or red; leaves with 3-7 leaflets...**84**
83. Fruits blue, purple or black; leaves with more than 7 leaflets...**Aralia**
84. Fruits swollen strawberrylike, with many "seeds" embedded in the surface...**85**
84. Fruits with 2 or 3 seeds...**Panax**
85. Fruits dry to pulpy; bracts below the fruit lobed...**Duchesnia**
85. Fruits juicy; bracts below the fruit not lobed...**Fragaria**
86. Plants with spines; fruiting head of clustered fruitlets as in a blackberry...**Rubus**
86. Plants without spines; fruits not as above...**87**
87. Leaves with teeth...**88**
87. Leaves without teeth...**93**
88. Fruits white...**89**
88. Fruits not white...**90**

89. Seeds 2-many, contained within a berrylike fruit...**Actaea**
89. Seeds single, naked, berrylike...**Caulophyllum**
90. Fruits red...**92**
90. Fruits blue, purple or black...**91**
91. Leaflets not lobed; seeds usually 5 per fruit...**Aralia**
91. Leaflets lobed; seeds borne singly, berrylike...**Caulophyllum**
92. Leaves with 3 leaflets; fruits resembling strawberries...**Duchesnia**
92. Leaves of many leaflets; fruits not like strawberries...**Actaea**
93. Fruits with 1-3 seeds...**94**
93. Fruits with more than 10 seeds...**Solanum**
94. Fruits orange or red when ripe...**Arisaema**
94. Fruits yellow, brown or purple...**Floerkea**
95. Succulent stems roughly spherical, not jointed...**Coryphantha**
95. Succulent stems flattened, jointed pads...**Opuntia**
96. Leaves simple...**97**
96. Leaves compound...**234**
97. Leaves opposite...**98**
97. Leaves mostly alternate...**125**
98. Leaf margins with teeth...**99**
98. Leaf margins without teeth...**105**
99. Fruits 1-seeded...**100**
99. Fruits with more than 1 seed...**101**
100. Fruits spherical, about as wide as long, with floral remnants at the apex...**Viburnum** (Note: **Euonymus** sometimes appears one-seeded)
100. Fruits elliptic, longer than wide, black, without floral remnants at apex...**Forestiera**
101. Seeds 2 per fruit...**Symphoricarpos**
101. Seeds more than 2 per fruit...**102**
102. Fruits black, with 3-4 seeds; branches with a sharp, terminal spine...**Rhamnus**
102. Fruits not black, usually with 3 to many seeds...**103**
103. Leaves usually lobed, hairy; fruit clusters red and orange, globose...**Broussonetia**
103. Leaves not lobed; fruits red, orange, purple or violet-pink...**104**
104. Fruits violet-pink to dark rose, in dense clusters along the stems; seeds 2-4, not red-coated (no arils)...**Callicarpa**
104. Fruits purple or red, single or in loose clusters in the leaf axils; seeds 3-10, with red coats (arils)...**Euonymus**
105. Leaves less than 0.5 cm wide...**106**
105. Leaves more than 0.5 cm wide...**108**
106. Fruits red, with 1 seed...**Taxus**
106. Fruits white, blue or black...**107**
107. Plants minute, growing on evergreen tree branches; fruits white...**Arceuthobium**
107. Plants terrestrial; berries blue, purple or black (rarely white)...**Juniperus**
108. Seed 1 per fruit...**109**
108. Seeds more than 1 per fruit...**119**
109. Leaves covered with tiny silvery or brownish scales on the under-surface...**Shepherdia**
109. Leaves without silvery or brownish scales...**110**
110. Fruits with floral remnants at apex...**111**
110. Fruits without floral remnants at apex...**114**
111. Fruits yellowish green at maturity, 1-2 cm long...**112**
111. Fruits not green when mature and fleshy...**113**
112. Fruits short-cylindric, about twice as long as wide...**Buckleya**
112. Fruits only slightly longer than wide...**Nestronia**

113. Leaves with main veins running somewhat parallel to the margin and ending near the apex...**Cornus**
113. Leaves with main veins ending near the margin and not curving toward the apex...**Viburnum**
114. Plants growing on tree branches; fruits white...**Phoradendron**
114. Plants not growing on tree branches...**115**
115. Fruits black or very dark purple...**116**
115. Fruits blue or vivid purple...**117**
116. Fruits less than 1 cm long...**Ligustrum**
116. Fruits more than 1 cm long...**Forestiera**
117. Leaf stalks less than 1 cm long...**Ligustrum**
117. Leaf stalks 1-2.5 cm long...**118**
118. Leaves deciduous; fruits waxy on surface, borne in loose, drooping clusters...**Chionanthus**
118. Leaves evergreen; fruits not waxy, borne in small, dense clusters...**Osmanthus**
119. Fruits with 2 or 3 seeds...**120**
119. Fruits with more than 3 seeds...**124**
120. Fruits black...**Ligustrum**
120. Fruits not black...**121**
121. Fruits without floral remnants at apex...**Chionanthus**
121. Fruits with floral remnants at apex...**122**
122. Leaves with lateral veins running somewhat parallel to the margin and arching toward the apex...**Cornus**
122. Leaves with lateral veins ending near the margin, not curving toward the apex...**123**
123. Fruit clusters at the branch tips...**Ligustrum**
123. Fruit clusters at leaf bases...**Symphoricarpos**
124. Fruits (or fruit pairs) less than 2 cm long...**Lonicera**
124. Fruits more than 3 cm long...**Calycanthus**
125. Leaves less than 0.5 cm wide...**126**
125. Leaves more than 0.5 cm wide...**129**
126. Fruits 1-seeded...**Taxus**
126. Fruits with more than 1 seed...**127**
127. Fruits with floral remnants at apex...**128**
127. Fruits without floral remnants at apex...**Empetrum**
128. Fruits white...**Gaultheria**
128. Fruits red...**Vaccinium**
129. Plants creeping or climbing...**130**
129. Plants not creeping or climbing...**166**
130. Leaves with marginal teeth...**131**
130. Leaves without marginal teeth...**147**
131. Plants with tendrils...**132**
131. Plants without tendrils (leaf stalks may twine)...**135**
132. Seeds 1-5 per fruit...**133**
132. Seeds more than 10 per fruit...**Passiflora**.
133. Pith of stems brown...**Vitis**
133. Pith of stems white...**134**
134. Fruits blue...**Ampelopsis**
134. Fruits black...**Cissus**
135. Fruits 1-seeded...**136**
135. Fruits with more than 1 seed...**140**
136. Leaves peltate, stalk attached near the margin; the single seed 7-9 mm, flat, ridged and crescent-shaped...**Menispermum**
136. Leaves not peltate; seed not as above...**137**

137. Plants creeping or very low and shrubby; fruits red to purple or black...**138**
137. Plants climbing or trailing vines; fruits not red...**139**
138. Low shrubs, forming mats; fruits less than 1 cm long...**Arctostaphylos**
138. Plants becoming more than 1 meter tall; fruits more than 1 cm long...**Prunus**
139. Leaf blades 3-6 cm long...**Berchemia**
139. Leaf blades 6-12 cm long...**Ampelopsis**
140. Fruits blue...**Ampelopsis**
140. Fruits not blue...**141**
141. Plants climbing or sprawling vines...**Celastrus**
141. Plants low, creeping...**142**
142. Fruitlets clustered in compact heads as in blackberries; plants usually with spines...**Rubus**
142. Fruits not borne as heads of fruitlets...**143**
143. Plants with spines...**144**
143. Plants without spines...**145**
144. Fruits with 5-10 seeds...**Pyracantha**
144. Fruits with more than 10 seeds...**Lycium**
145. Seeds 5 or fewer per fruit...**Arctostaphylos**
145. Seeds more than 10 per fruit...**146**
146. Fruits red-glandular...**Ribes**
146. Fruits not red-glandular...**Vaccinium**
147. Fruits 1-seeded...**148**
147. Fruits with more than 1 seed...**153**
148. Plants with tendrils or twining leaf stalks...**149**
148. Plants without tendrils...**150**
149. Seed crescent-shaped, flat, ridged... **Menispermum**
149. Seed(s) spherical...**Smilax**
150. Fruits less than 1 cm long...**151**
150. Fruits more than 1 cm long...**Calycocarpum**
151. Fruits blue to almost black...**Berchemia**
151. Fruits red...**152**
152. Plants low, shrubby, sometimes creeping; leaves 1-4 cm long...**Arctostaphylos**
152. Plants climbing; leaves 5-15 cm long...**Cocculus**
153. Fruits white; plants creeping...**154**
153. Fruits not white...**155**
154. Leaves less than 1 cm wide...**Gaultheria**
154. Leaves more than 1 cm wide...**Epigaea**
155. Plants with spines...**156**
155. Plants without spines...**158**
156. Plants with tendrils...**Smilax**
156. Plants without tendrils...**157**
157. Fruits more than 1 cm long, with more than 10 seeds...**Lycium**
157. Fruits less than 1 cm long, with 2-10 seeds...**Cotoneaster**
158. Plants creeping...**159**
158. Plants climbing...**162**
159. Seeds 2-5 per fruit...**160**
159. Seeds more than 10 per fruit...**161**
160. Leaves more than 4 cm long; fruits black...**Hedera**
160. Leaves 1-3 cm long; fruits red (purple to black on a rare, alpine species)...**Arctostaphylos**
161. Leaves less than 2 cm long; fruits spherical, with floral remnants at apex...**Vaccinium**
161. Leaves more than 2 cm long; fruits elliptic, longer than wide,without floral remnants at apex...**Lycium**

162. Plants with tendrils...**163**
162. Plants without tendrils...**164**
163. Fruits less than 1 cm long with fewer than 10 seeds...**Smilax**
163. Fruits more than 1 cm long with more than 10 seeds...**Passiflora**
164. Fruits black...**Hedera**
164. Fruits red...**165**
165. Fruits less than 1 cm long, nearly spherical...**Solanum**
165. Fruits more than 1 cm long, elliptic, longer than wide...**Lycium**
166. Leaves with teeth...**167**
166. Leaves without teeth...**198**
167. Plants with spines...**168**
167. Plants without spines...**178**
168. Some spines branched; fruits red or yellow...**Berberis**
168. Spines not branched...**169**
169. Fruit cluster a compact head of fruitlets as in blackberries...**Rubus**
169. Fruits not in heads of clustered fruitlets...**170**
170. Seeds 1 per fruit...**171**
170. Seeds more than 1 per fruit...**172**
171. Fruits with floral remnants at apex...**Crataegus**
171. Fruits without floral remnants at apex...**Prunus**
172. Fruits 2-seeded...**Oplopanax**
172. Fruits with more than 2 seeds...**173**
173. Seeds 5-10 per fruit...**174**
173. Seeds more than 10 per fruit...**176**
174. Leaves with blunt teeth... **Pyracantha**
174. Leaves with sharp teeth...**175**
175. Spines with a bud at base...**Pyrus**
175. Spines without buds...**Crataegus**
176. Fruits less than 3 cm long...**177**
176. Fruits more than 4 cm long...**Chaenomeles**
177. Fruits with floral remnants at apex...**Ribes**
177. Fruits without floral remnants at apex...**Solanum**
178. Fruits 1-seeded...**179**
178. Fruits with more than 1 seed...**183**
179. Fruits coated with dense, pale wax...**Myrica**
179. Fruits not encased in wax,...**180**
180. Fruits with many fleshy projections...**Planera**
180. Fruits without fleshy projections...**181**
181. Leaves with 3 major veins, the lateral ones arching from the base of the blade toward the tip, bases unequally lobed...**Celtis**
181. Leaves with major veins branching from the midvein, bases nearly equal...**182**
182. Fruits with floral remnants at apex; pith of branches divided by woody plates...**Nyssa**
182. Fruits without floral remnants at apex; pith of branches not divided by woody plates...**Prunus**
183. Fruits with 2-10 seeds...**184**
183. Fruits with more than 10 seeds...**192**
184. Fruits with floral remnants at apex...**185**
184. Fruits without floral remnants at apex...**190**
185. Fruits with tough cores...**186**
185. Fruits without tough cores...**188**
186. Leaves with stiff, black hairs on the midvein of the upper side of the blade...**Aronia**
186. Leaves without stiff, black hairs on the midvein...**187**

187. Core of the fruit with about 10 cavities, with 1 seed per cavity...**Amelanchier**
187. Core of the fruit with 2-5 cavities with 2 seeds per cavity...**Pyrus**
188. Fruits blue or black...**Gaylussacia**
188. Fruits red or orange...**189**
189. Plants shrubby, not lax and creeping...**Pyracantha**
189. Plants creeping...**Gaultheria**
190. Seeds 2-3 per fruit...**Rhamnus**
190. Seeds 4-8 per fruit...**191**
191. Buds and leaf stalks purple...**Nemopanthus**
191. Buds and leaf stalks not purple...**Ilex**
192. Fruitlets in a compact cluster...**193**
192. Fruits not clustered...**195**
193. Fruit clusters mostly spherical, red and orange...**Broussonetia**
193. Fruit clusters cylindric, white to rose-purple or black...**194**
194. Trees; not spiny; fruitlets with floral remnants at apex...**Morus**
194. Shrubs; often spiny; fruitlets without floral remnants at apex...**Rubus**
195. Fruits less than 2 cm long...**196**
195. Fruits more than 2 cm long...**197**
196. Leaves lobed...**Ribes**
196. Leaves not lobed...**Vaccinium**
197. Plants with spines...**Chaenomeles**
197. Plants without spines...**Cydonia**
198. Fruits 1-seeded...**199**
198. Fruits with more than 1 seed...**216**
199. Fruits more than 4 cm long...**Asimina**
199. Fruits less than 3 cm long...**200**
200. Leaves and fruits covered with tiny, silvery scales...**Elaeagnus**
200. Leaves and fruits without silvery scales...**201**
201. Plants with spines...**202**
201. Plants without spines...**203**
202. Fruits red or yellow...**Berberis**
202. Fruits black...**Bumelia**
203. Leaves lobed and unlobed; fruits blue to dark purple...**Sassafras**
203. Leaves not lobed...**204**
204. Fruits white, covered with white wax...**Myrica**
204. Fruits not white or covered with wax...**205**
205. Fruits oval to pear-shaped, 1.5-3 cm long, brown, yellow or green...**Pyrularia**
205. Fruits not pear-shaped...**206**
206. Fruits strongly curved, brown or red...**Cotinus**
206. Fruits not strongly curved...**207**
207. Fruits with floral remnants at apex...**208**
207. Fruits without floral remnants at apex...**210**
208. Fruits red...**Daphne**
208. Fruits blue or black...**209**
209. Leaves with lateral veins running parallel to the margin and ending near the apex of the blade; pith of branches not divided by woody plates...**Cornus**
209. Leaves with lateral veins running toward the margin, not ending near the apex of the blade; pith of branches divided by woody plates...**Nyssa**
210. Fruits blue, purple or black...**211**
210. Fruits yellow, orange, red or green...**213**
211. Leaves mostly clustered in fascicles at the ends of short shoots, their tips broadly rounded...**Bumelia**
211. Leaves not in fascicles on short shoots; tips sharply to bluntly pointed...**212**

212. Leaf bases with unequal lobing; major veins arching from the base toward the tip...**Celtis**
212. Leaf bases nearly equal; major veins branching off the midvein...**Persea**
213. Fruits spherical, without stalks, red...**Daphne**
213. Fruits oval or elliptic, stalked...**214**
214. Plants spicy-aromatic when crushed...**Lindera**
214. Plants not spicy-aromatic...**215**
215. Leaf bases nearly equal; young stems pliant, easily bent without breaking...**Dirca**
215. Leaf bases unequal; young stems stiff, not easily bent without breaking...**Celtis**
216. Fruits with 2-10 seeds...**217**
216. Fruits with more than 10 seeds...**227**
217. Plants with spines... **218**
217. Plants without spines...**219**
218. Fruits noticeably longer than broad...**Berberis**
218. Fruits spherical, not noticeably longer than broad...**Cotoneaster**
219. Fruits 2 cm long or more...**220**
219. Fruits less than 2 cm long...**221**
220. Fruits 4-15 cm long, usually longer than wide; without a cup of flower remnants at base...**Asimina**
220. Fruits 2-6 cm long, about as wide; with a persistent crown of tough flower parts at base...**Diospyros**
221. Fruits with floral remnants at apex...**222**
221. Fruits without floral remnants at apex...**225**
222. Fruits red...**223**
222. Fruits blue or black...**224**
223. Plants with spines...**Cotoneaster**
223. Plants without spines...**Gaultheria**
224. Fruits with 2 seeds...**Cornus**
224. Fruits with 10 seeds...**Gaylussacia**
225. Seeds 2-3 per fruit...**Rhamnus**
225. Seeds 4-8 per fruit...**226**
226. Buds and leaf stalks purple...**Nemopanthus**
226. Buds and leaf stalks not purple...**Ilex**
227. Fruits more than 5 cm long...**228**
227. Fruits less than 5 cm long...**229**
228. Fruits conelike, red, pink or brown, the red seeds hanging out by threads at maturity...**Magnolia**
228. Fruits not conelike, spherical, yellow-green to brown...**Maclura**
229. Leaves lobed...**230**
229. Leaves not lobed...**231**
230. Fruits red, without floral remnants at apex...**Solanum**
230. Fruits not red, with floral remnants at apex...**Ficus**
231. Fruits with floral remnants at apex...**232**
231. Fruits without floral remnants at apex...**233**
232. Fruits red; plants with wintergreen odor when crushed...**Gaultheria**
232. Fruits not red; plants without wintergreen odor...**Vaccinium**
233. Fruits less than 1 cm long, spherical, as wide as long...**Solanum**
233. Fruits more than 1 cm long, elliptic, longer than wide...**Lycium**
234. Stalks of the compound leaves opposite...**235**
234. Stalks of the compound leaves alternate...**236**
235. Leaves with teeth...**Sambucus**
235. Leaves without teeth...**Phellodendron**
236. Fruits of clustered fruitlets in a compact head as in blackberries...**Rubus**
236. Fruits not heads of fruitlets...**237**

237. Fruits less than 1 cm long...**238**
237. Fruits 1 cm long or more...**247**
238. Fruits with 1-10 seeds...**239**
238. Fruits with more than 10 seeds...**246**
239. Fruits white or yellowish; with 1 seed...**Toxicodendron**
239. Fruits not white or yellowish; with 1 or more seeds...**240**
240. Fruits red or brown...**241**
240. Fruits blue, purple or black...**243**
241. Plants with spines...**Zanthoxylum**
241. Plants without spines...**242**
242. Fruits with 1 seed...**Rhus**
242. Fruits with more than 1 seed...**Sorbus**
243. Plants creeping or climbing...**244**
243. Plants not creeping or climbing...**Aralia**
244. Leaves with 3 leaflets...**Cissus**
244. Leaves with 5 or more leaflets...**246**
245. Leaves with few palmately divided leaflets...**Parthenocissus**
245. Leaves divided into many small leaflets (twice pinnate)...**Ampelopsis**
246. Fruits with floral remnants at apex; plants often with spines...**Rosa**
246. Fruits without floral remnants at apex; plants without spines...**Solanum**
247. Fruits more than 3 cm long...**248**
247. Fruits less than 3 cm long...**249**
248. Vines; leaflets 5, not toothed...**Akebia**
248. Trees; leaflets 5-19, with teeth...**Juglans**
249. Seed 1 per fruit...**250**
249. Seeds 2 or more per fruit...**253**
250. Leaflets fewer than 20, borne along a single leaf stalk...**251**
250. Leaflets many, borne on branched leaf stalks...**Melia**
251. Leaflets 3, usually toothed...**Toxicodendron**
251. Leaflets 5 or more, usually not toothed...**252**
252. Leaf stalks red when fresh; leaflets nearly equal at base, oval with abruptly pointed tips...**Toxicodendron**
252. Leaf stalks greenish, not red; leaflets with unequal bases and elongated, lance-shaped tips...**Sapindus**
253. Fruits with 3-10 seeds; plants without spines; trees...**Sorbus**
253. Fruits with more than 10 seeds; plants usually with spines; shrubs...**Rosa**

GENERA OF PLANTS WITH FLESHY FRUITS

FOUND GROWING WILD IN NORTHEASTERN NORTH AMERICA

1. **Actaea spp.** baneberry (AMA 21)
2. **Akebia quinata** five-leaf akebia
3. **Amelanchier spp.** shadbush, service-berry
4. **Ampelopsis spp.** pepper-vine (H&A 153)
5. **Aralia spp.** sarsaparilla, spikenard, Hercules-club
6. **Arceuthobium pusillum** dwarf mistletoe
7. **Arctostaphylos spp.** bearberry, manzanita
8. **Arisaema spp.** Jack-in-the-pulpit, Indian turnip (AMA 33)
9. **Aronia spp.** chokeberry
10. **Asarum canadense** wild ginger
11. **Asimina spp.** pawpaw (AMA 192)
12. **Asparagus officionalis** asparagus
13. **Atropa belladonna** belladonna (AMA 36)
14. **Belamcanda chinensis** blackberry lily (H&A 153)
15. **Berberis spp.** barberry
16. **Berchemia scandens** supple-jack, rattan-vine (H&A 153)
17. **Broussonetia papyrifera** paper mulberry
18. **Buckleya distichophylla** buckleya
19. **Bumelia spp.** bumelia, ironwood
20. **Calla palustris** wild calla, water arum (AMA 43, 197)
21. **Callicarpa americana** beauty-berry, French mulberry
22. **Calycanthus spp.** Carolina allspice (AMA 47)
23. **Calycocarpum lyonii** cupseed
24. **Caulophyllum spp.** blue cohosh (AMA 52)
25. **Celastrus spp.** bittersweet (AMA 53)
26. **Celtis spp.** hackberry, sugarberry
27. **Chaenomeles spp.** Japanese quince
28. **Chenopodium capitatum** Indian-paint, strawberry-blite
29. **Chionanthus virginicus** fringe-tree, old-man's-beard
30. **Cissus incisa** possum grape, marine-vine
31. **Clintonia spp.** clintonia, dogberry, bluebead (H&A 154)
32. **Cocculus carolinus** coralbeads, snailseed
33. **Convallaria spp.** lily-of-the-valley (AMA 6, 62)
34. **Cornus spp.** dogwood, osier, bunchberry
35. **Coryphantha (Mamillaria) vivipara** mamillaria, bird's-nest cactus
36. **Cotinus spp.** smoke-tree (AMA 199)
37. **Cotoneaster spp.** cotoneaster
38. **Crataegus spp.** hawthorn, thorn apple
39. **Cydonia oblonga** quince
40. **Daphne mezerium** daphne, mezerium (AMA 68)
41. **Diospyros virginiana** persimmon
42. **Diphylleia cymosa** umbrella-leaf (H&A 155)

43. **Dirca palustris** leatherwood, rope-bark (AMA 74, 198)
44. **Disporum spp.** fairy-bells, mandarin
45. **Duchesnia indica** Indian strawberry, false strawberry
46. **Echinocystis lobata** wild cucumber, wild balsam apple
47. **Elaeagnus spp.** oleaster, Russian olive, silverberry
48. **Empetrum spp.** crowberry
49. **Epigaea repens** trailing arbutus, mayflower
50. **Euonymus spp.** burning-bush, spindle-tree, strawberry-bush (AMA 79)
51. **Ficus carica** fig (AMA 198)
52. **Floerkea proserpinacoides** false mermaid
53. **Forestiera acuminata** swamp privet (H&A 155)
54. **Fragaria spp.** strawberry
55. **Galium spp.** bedstraw
56. **Gaultheria (Chiogenes) spp.** wintergreen, checkerberry, snowberry
57. **Gaylussacia spp.** huckleberry
58. **Geocaulon lividum** northern comandra (H. & A. see *Comandra*)
59. **Hedera helix** English ivy (AMA 87, 192)
60. **Hexastylis (Asarum) spp.** heart-leaf
61. **Hydrastis canadensis** golden-seal, orange-root
62. **Ilex spp.** holly, winterberry, black alder (AMA 6, 97)
63. **Juglans spp.** walnut (AMA 193)
64. **Juniperus spp.** juniper, red cedar, ground hemlock
65. **Leucophysalis grandiflora** large white-flowered ground cherry (see *Physalis* AMA 132)
66. **Ligustrum spp.** privet (AMA 107)
67. **Lindera spp.** spicebush, benzoin
68. **Lonicera spp.** honeysuckle (AMA 109)
69. **Lycium spp.** matrimony-vine (AMA 110)
70. **Maclura pomifera** osage orange (AMA 194)
71. **Magnolia spp.** magnolia (AMA 194)
72. **Maianthemum canadense** false lily-of-the-valley, Canada mayflower (H&A 156)
73. **Medeola virginiana** Indian cucumber-root (H&A 156)
74. **Melia azederach** Chinaberry, pride-of-India (AMA 115)
75. **Melothria pendula** melonette, creeping cucumber
76. **Menispermum canadense** moonseed (AMA 10, 117)
77. **Mitchella repens** partridge-berry, twinberry
78. **Morus spp.** mulberry
79. **Myrica spp.** bayberry, wax myrtle
80. **Nemopanthus mucronata** mountain holly
81. **Nestronia umbellula** nestronia
82. **Nicandra physalodes** apple-of-Peru, shoofly (H&A 140)
83. **Nymphaea spp.** white waterlily
84. **Nyssa spp.** sour gum, tupelo, pepperidge
85. **Oplopanax horridus** devil's-club
86. **Opuntia spp.** prickly-pear cactus (AMA 185, 196)
87. **Osmanthus americanus** wild olive, devilwood
88. **Panax spp.** ginseng, groundnut
89. **Parthenocissus spp.** woodbine, Virginia-creeper (AMA 197, H&A 97)
90. **Passiflora spp.** passion-flower, maypops
91. **Peltandra spp.** arrow arum, tuckahoe
92. **Persea borbonia** red bay
93. **Phellodendron japonicum** Japanese cork-tree
94. **Phoradendron serotinum (flavescens)** American mistletoe (AMA 131)

95. **Physalis spp.** ground cherry, husk tomato (AMA 132)
96. **Phytolacca americana** pokeweed, pokeberry, pigeon-berry (AMA 6, 133)
97. **Planera aquatica** planer-tree, water elm
98. **Podophyllum peltatum** may apple, mandrake (AMA 6, 136)
99. **Polygonatum spp.** Solomon's-seal (H&A 158)
100. **Polygonum perfoliatum** mile-a-minute-weed
101. **Prunus spp.** cherry, plum (AMA 138)
102. **Pyracantha coccinea (Cotoneaster)** fire-thorn
103. **Pyrularia pubera** oilnut, buffalo-nut (H&A 158)
104. **Pyrus (Malus) spp.** apple, pear, crabapple
105. **Rhamnus spp.** buckthorn (AMA 140)
106. **Rhus spp.** sumac
107. **Ribes spp.** currant, gooseberry
108. **Rosa spp.** rose (AMA 194)
109. **Rubus spp.** blackberry, raspberry, baked-apple-berry
110. **Sambucus spp.** elderberry (AMA 147)
111. **Sapindus drummondii** soapberry (H&A 158)
112. **Sassafras albidum** sassafras
113. **Shepherdia canadensis** soapberry
114. **Smilacina spp.** false Solomon's-seal
115. **Smilax spp.** greenbrier, catbrier (H&A 158)
116. **Solanum spp.** nightshade, bittersweet, horse nettle, potato (AMA 10, 57-158, 194, 195)
117. **Sorbus spp.** mountain ash
118. **Streptopus spp.** twisted-stalk, mandarin (H&A 158)
119. **Symphoricarpos spp.** snowberry, wolfberry, coralberry (AMA 165)
120. **Symplocarpus foetidus** skunk cabbage (AMA 166)
121. **Taxus spp.** yew (AMA 167)
122. **Toxicodendron (Rhus) spp.** poison ivy, poison oak, poison sumac (TOXIC TO HANDLE!, AMA 188, 199)
123. **Trillium spp.** trillium, wakerobin, birthroot
124. **Triosteum spp.** feverwort, horse gentian, wild coffee
125. **Vaccinium spp.** blueberry, cranberry
126. **Viburnum spp.** arrowwood, highbush cranberry, wild raisin
127. **Vitis spp.** grape
128. **Zanthoxylum spp.** prickly ash, Hercules-club

SUGGESTED REFERENCES

Brockman, C. F. 1968. *Trees of North America*. Golden Press, New York, NY.

Dwelley, M. 1973. *Spring Wildflowers of New England*. Down East Enterprises Inc., Camden, ME.

_____. 1977. *Summer and Fall Wildflowers of New England*. Down East Enterprises Inc., Camden, ME.

_____. 1980. *Trees and Shrubs of New England*. Down East Enterprises, Camden ME.

Elias, T. S. 1980. *Trees of North America*. van Nostrand Reinhold Co., New York, NY.

Fernald, M. L. 1950. *Gray's Manual of Botany*. 8th. ed, American Book Co., New York, NY.

Gleason, H. A. 1952. *The New Britton and Brown Illustrated Flora of the Northeastern U. S. and Adjacent Canada*. Lancaster Press, PA. (3 vols.)

_____ & A. Cronquist. 1963. *Manual of Vascular Plants of the Northeastern U.S. and Adjacent Canada*. Van Nostrand, New York, NY.

Hardin, J. W. & J. M. Arena. 1974. *Human Poisoning from Native and Cultivated Plants*. 2nd ed., Duke Univ. Press, Durham, NC.

Kingsbury, J. M. 1964. *Poisonous Plants of the United States and Canada*. Prentice-Hall, NJ.

_____. 1965. *Deadly Harvest: A Guide to Common Poisonous Plants*. Holt, Rinehart and Winston, New York, NY.

Lampe, K. F. & R. Fagerstrom. 1968. *Plant Toxicity and Dermatitis. A Manual for Physicians*. Williams & Wilkins, Baltimore, MD.

_____ & M. A. McCann. 1985. *AMA Handbook of Poisonous and Injurious Plants*. Amer. Med. Assoc., Review Press, Chicago, IL.

Lewis, W. H. & M. P. F. Elvin-Lewis. 1977. *Medical Botany. Plants Affecting Man's Health*. Wiley & Sons, Toronto, Canada.

Muenscher, W. C. 1975. *Poisonous Plants of the United States*. MacMillan Publ. Co., New York, NY.

Marderosian, A. der, & L. Liberti. 1988. *Natural Product Medicine*. G. F. Stickley Co., Philadelphia, PA.

Miller, D. 1986. Berry Finder. *A Guide to Native Plants with Fleshy Fruits for Eastern North America*. Nature Study Guild, Berkeley, CA.

Newcomb, L. 1977. *Newcomb's Wildflower Guide*. Little, Brown, Boston, MA.

Peterson, L. A. 1977. *A Field Guide to Edible Plants*. Houghton Mifflin, Boston, MA.

Peterson, M. G. 1973. *How to Know Wild Fruits*. Dover Publications, New York, NY.

Peterson, R. T. & M. McKenny. 1968. *A Field Guide to Wildflowers*. Houghton Mifflin, Boston, MA.

Petrides, G. A. 1958. *A Field Guide to Trees and Shrubs.* Houghton Mifflin, Boston, MA.

Reader's Digest Books. 1982. *North American Wildlife.* The Reader's Digest Association. Pleasantville, New York, NY.

Symonds, G. W. D. 1958. *The Tree Identification Book.* W. Morrow & Co., New York., NY

_____ 1963. *The Shrub Identification Book.* M. Barrows & Co., New York, NY.

Westbrooks, R. G. & J. W. Preacher. 1986. *Poisonous Plants of Eastern North America.* Univ. North Carolina Press, Chapel Hill, NC.

Appendix 1.

Using the Computer Key to Plants with Fleshy Fruits

Contributed by Everett Ogden

Random access keys lend themselves particularly well to computerization. Indeed, the term "random access" comes from the computer term "random access memory", whose elements may be addressed in any order. The program on the enclosed disk eases the identification process by keeping track of the characters selected and displaying a list of plants that may have those characters.

Hardware required

You will need a computer compatible with the IBM PC, XT or AT, equipped with a disk drive capable of reading a 5 1/4" 360K floppy disk. The display must be 80 characters by 25 lines, either color or monochrome (color preferred).

Starting the Program

There are two files on the enclosed disk. FRUITKEY.EXE is the only one needed to run the program. FRUITKEY.BAS will be useful only to those who want to modify the program as described below. Although the program can be run by merely inserting the disk provided into a floppy drive and typing a command, you will not want to risk damage to your disk by constantly using it. You should copy the file FRUITKEY.EXE to either another floppy disk or to a suitable subdirectory on a hard disk for frequent use. Then you can address the copied disk or subdirectory where the file is stored and run the program by entering the command:

FRUITKEY

The opening screen of the program should appear.

Program Operation

Figure 1 shows the screen when the program is first run, or when R has been selected to reset it to the starting point. Select by number the characters matching the plant you are trying to identify. When you enter the first character, the top of the screen will change to display a list of numbers corresponding to those kinds of plants (genera) that have not been eliminated by your choice. An asterisk appears next to the character to indicate that it has been chosen. For those people using a color display, the character also changes color. All characters that apply to your specimen may be chosen. For instance, if fruits on the plant are both red and orange, both may be selected. Continue entering characters that apply to your plant until only one genus number remains, or the available characters are exhausted. Then look up the remaining numbers in this manual and go to the illustrations starting on p. 50 for further information. Other reference books are recommended to complete or verify the identification (see p. 80).

If you think that one of your choices was incorrect, you may undo its effect by entering the negative of its number. For example, if you choose character 15 but later decide the choice was a poor one, you may enter -15 to remove it. Attempts to use a character more than once or to unuse a character that has not been used are ignored.

Figure 2 shows the screen when characters 10, 16 and 18 have been selected. To see the plant names associated with the remaining numbers, press N. Figure 3 shows an example of the name display.

Press R to reset the program to identify another plant. Press Q to quit. You will be returned to the DOS command prompt.

```
                    Random Access Fleshy Fruit Key

                 Select character by entering its number
                 Unuse character by entering its negative


   FRUITS
 1 White or light gray   4 Orange        7 Purple      10 Less than 1 cm long
 2 Brown or tan          5 Red or pink   8 Green       11 1-2 cm long
 3 Yellow                6 Blue          9 Black       12 More than 2 cm long

13 With floral remnants at apex            15 With 1 seed
14 Without floral remnants at apex         16 With 2-10 seeds
                                           17 With more than 10 seeds
   PLANTS
18 Woody             20 Creeping or climbing          22 With spines
19 Not woody         21 Not creeping or climbing      23 Without spines

   LEAVES
24 Opposite
25 Whorled or basal      27 Simple       29 Lobed          31 With teeth
26 Alternate             28 Compound     30 Not lobed      32 Without teeth

Character? _                          N: Names    R: Reset    Q: Quit
```

Figure 1. Opening Screen

```
  3   4   5   7   9  15  21  25  29  30  34  37  38  48  50  56  57  59  62  64
 66  68  80  85  89  94 102 105 109 110 115 116 117 119 127 128




   FRUITS
 1 White or light gray   4 Orange        7 Purple     *10 Less than 1 cm long
 2 Brown or tan          5 Red or pink   8 Green       11 1-2 cm long
 3 Yellow                6 Blue          9 Black       12 More than 2 cm long

13 With floral remnants at apex            15 With 1 seed
14 Without floral remnants at apex        *16 With 2-10 seeds
                                           17 With more than 10 seeds
   PLANTS
*18 Woody            20 Creeping or climbing          22 With spines
 19 Not woody        21 Not creeping or climbing      23 Without spines

   LEAVES
 24 Opposite
 25 Whorled or basal     27 Simple       29 Lobed          31 With teeth
 26 Alternate            28 Compound     30 Not lobed      32 Without teeth

Character? _                          N: Names    R: Reset    Q: Quit
```

Figure 2. Screen with Characters 10, 16 and 18 Selected

```
  3 Amelanchier      89 Parthenocissus
  4 Ampelopsis       94 Phoradendron
  5 Aralia          102 Pyracantha
  7 Arctostaphylos  105 Rhamnus
  9 Aronia          109 Rubus
 15 Berberis        110 Sambucus
 21 Callicarpa      115 Smilax
 25 Celastrus       116 Solanum
 29 Chionanthus     117 Sorbus
 30 Cissus          119 Symphoricarpos
 34 Cornus          127 Vitis
 37 Cotoneaster     128 Zanthoxylum
 38 Crataegus
 48 Empetrum
 50 Euonymus
 56 Gaultheria
 57 Gaylussacia
 59 Hedera
 62 Ilex
 64 Juniperus
 66 Ligustrum
 68 Lonicera
 80 Nemopanthus
 85 Oplopanax
Press RETURN to continue_
```

Figure 3. Names of Remaining Choices (Genera)

Program Description

This section is primarily for those who wish to construct their own random access keys by modifying this program. Those who wish merely to run the program as listed may skip this.

One goal in writing the program was to make the code as generic as possible except for the data statements. Thus a different key could be constructed simply by changing the data statements, with few or no changes to the program itself. There are limits to how much information can be displayed on one screen, so a key with many more characters or genera might require some changes to the way the program operates.

Lines 10 through 120 create the variables to be used and load the data statements (starting at Line 1000) into the appropriate arrays. Lines 50 and 60 create all of the simple (non-array) variables. This is important for two reasons. It helps the programmer to keep track of the variable names used, and creating all simple variables before array variables can speed up program execution noticeably in Microsoft BASIC. Line 130 initializes an array to keep track of the deletions and a string to flag the used characters. Lines 140-200 paint the screen. Line 180 calls a subroutine (lines 400-440) to print the character list in red if the character has been used and cyan if not.

Line 210 calls a user input subroutine (Lines 500-610). This was originally a simple LINE INPUT statement which worked well with all tested versions of Microsoft BASIC except IBM's. An error in IBM's code prevents INPUT statements from working properly on the bottom line of the screen. Lines 230-260 check the validity of the input. If the user pressed N, R or Q, Line 230 jumps to 900 to print the names, 130 to start over or 999 to end the program.

If the input is a valid number, either positive (to use a character) or negative (to unuse it), Lines 270-290 get the deletion list for that character and, for each deleted genus in the list, either decrement or increment the corresponding element in the deletion array, depending on the sign of the input. Finally, Lines 300-360 reprint the list of remaining genera, change the color of the selected character and return for the next input.

Line 1000 begins the data statements specific to this key. It contains a number for each genus (128), characters (32) and menu items (35: 32 characters plus the headings FRUITS, PLANTS and LEAVES), and the title. Lines 1010 through 1320 contain the deletion lists. Each is a string of 128 digits, (one for each genus) and there are 32 such strings (one for each character). Line 1010 holds the deletion list for character 1, and Line 1320 corresponds to character 32. As a programmer's convenience, the middle two digits of the line number are the same as the character number. In each string, the leftmost digit corresponds to genus 1 and the rightmost to genus 128. A "1" means that the plant might exhibit that character, and a "0" means that it does not. Note that if you are making up your own key and are unsure whether a particular genus can have a certain character, it is safest to say that it can ("1") to avoid an incorrect deletion.

Lines 2000-2190 hold the genus names. Lines 3000-3350 hold the menu items (list of characters) in a format of row number, column number and text to print. The program expects the characters to be listed first, and it prints them in cyan. Any entries beyond the number of characters are assumed to be headings and are printed in bright yellow.

Table 1.

FRUITKEY.BAS Program Listing

```
10 REM R.A. Key to Fleshy Fruits
20 REM Everett Ogden, 04/08/89
30 REM Data by Eugene C. Ogden
40 DEFINT A-Z
50 DIM CL, CN, CHAR, TAXA, I, J, K, MENU, SN, GREEN, CYAN, RED, YELLOW, WHITE, BRIGHT
60 DIM Z$, CH$, IN$, KY$, DL$, ESC$, TAXA$, USED$, CMND$, STAR$, TITLE$
70 CMND$ = "*NnRrQq": Z$ = "0": GREEN = 2: CYAN = 3: RED = 4: YELLOW = 6: WHITE = 7: BRIGHT = 8
80 READ TAXA, CHAR, MENU, TITLE$
90 DIM NM(TAXA), NM$(TAXA), TAXA$(CHAR), CHAR$(MENU), CHLOC(MENU, 2)
100 FOR I = 1 TO CHAR: READ TAXA$(I): NEXT
110 FOR I = 1 TO TAXA: READ NM$(I): NEXT
120 FOR I = 1 TO MENU: READ CHLOC(I, 1), CHLOC(I, 2), CHAR$(I): NEXT
130 FOR I = 1 TO TAXA: NM(I) = 1: NEXT: CH$ = STRING$(CHAR, "0")
140 CL = INT(TAXA / 20) + 1: IF (TAXA MOD 20) <> 0 THEN CL = CL + 1
150 KEY OFF: CLS : COLOR YELLOW: LOCATE 2, INT((80 - LEN(TITLE$)) / 2): PRINT TITLE$
160 LOCATE 4, 22: PRINT "Select character by entering its number"
170 LOCATE 5, 22: PRINT "Unuse character by entering its negative"
180 GOSUB 400
190 LOCATE 25, 1,1: COLOR WHITE: PRINT "Character?         ";
200 LOCATE 25, 40: COLOR GREEN: PRINT "N: Names    R: Reset    Q: Quit"; : COLOR YELLOW
210 LOCATE 25, 12: PRINT " "; :LOCATE 25, 12: GOSUB 500
220 LOCATE 25, 20: PRINT SPACE$(20);
230 ON INT(INSTR(CMND$, LEFT$(IN$, 1)) / 2) GOTO 900, 130, 999
240 CN = ABS(VAL(IN$)): IF CN <= CHAR AND CN >= 1 THEN 260: REM Entry in range
250 BEEP: LOCATE 25, 20: COLOR BRIGHT + RED: PRINT "NO CHAR. "; IN$; : COLOR YELLOW: GOTO 190
260 SN = SGN(VAL(IN$)): IF SN = 1 THEN USED$ = "1" ELSE USED$ = "0"
270 DL$ = TAXA$(CN): I = 0
280 IF MID$(CH$, CN, 1) = USED$ THEN 190 ELSE MID$(CH$, CN, 1) = USED$
290 I = INSTR(I + 1, DL$, Z$): IF I THEN NM(I) = NM(I) - SN: GOTO 290
300 FOR I = 1 TO CL - 1: LOCATE I, 1: PRINT SPC(79); " "; : NEXT
310 LOCATE 1, 1: COLOR YELLOW: FOR I = 1 TO TAXA: IF NM(I) < 1 THEN 330
320 PRINT USING " ###"; I;
330 NEXT
340 IF MID$(CH$, CN, 1) = "1" THEN COLOR RED: STAR$ = "*" ELSE COLOR CYAN: STAR$ = " "
350 LOCATE CHLOC(CN, 1), CHLOC(CN, 2): PRINT STAR$; CHAR$(CN);
360 GOTO 190
400 FOR I = 1 TO MENU
410 IF I > CHAR THEN COLOR BRIGHT + YELLOW: STAR$ = " ": GOTO 430
420 IF MID$(CH$, I, 1) = "1" THEN COLOR RED: STAR$ = "*" ELSE COLOR CYAN: STAR$ = " "
430 LOCATE CHLOC(I, 1), CHLOC(I, 2): PRINT STAR$; CHAR$(I);
440 NEXT: RETURN
500 IN$ = "": KY$ = "": WHILE LEN(IN$) < 4 AND KY$ <> CHR$(13)
510 KY$ = INKEY$: IF LEN(KY$) <> 1 THEN 510
520 IF LEN(IN$) > 0 THEN 560
530 IF INSTR("NnRrQq", KY$) <> 0 THEN IN$ = KY$: RETURN
540 IF INSTR("-0123456789", KY$) <> 0 THEN IN$ = KY$: PRINT KY$; :  ELSE BEEP
550 GOTO 610
560 IF INSTR("0123456789", KY$) <> 0 THEN IN$ = IN$ + KY$: PRINT KY$; : GOTO 610
570 IF KY$ <> CHR$(8) THEN 600
580 IN$ = LEFT$(IN$, LEN(IN$) - 1)
590 LOCATE 25, 12: PRINT IN$; " "; : LOCATE 25, 12 + LEN(IN$): GOTO 610
600 IF KY$ <> CHR$(13) THEN BEEP
610 WEND: RETURN
900 CLS : J = 1: K = 1: FOR I = 1 TO TAXA: IF NM(I) < 1 THEN 950
910 IF J = 25 THEN J = 1: K = K + 20:  ELSE 940
920 IF K > 61 THEN K = 1: LOCATE 25, 1: COLOR GREEN:  ELSE 940
930 PRINT "Press RETURN for more"; : COLOR YELLOW: LINE INPUT IN$: CLS
940 LOCATE J, K: PRINT USING "### "; I; : PRINT NM$(I); : J = J + 1
950 NEXT: LOCATE 25, 1: COLOR GREEN: PRINT "Press RETURN to continue";
960 LINE INPUT IN$: CLS : GOSUB 400: CN = 1: GOTO 300
999 CLS : SYSTEM
```

Table 1 Continued

```
1000 DATA 128,32,35,"Random Access Fleshy Fruit Key": REM TAXA$ data  7/5/89
1010 DATA 1000010000000000000000000000001001000000000000111000000100000001000000000000011100
          0000000000001000100000000000100000000100110000
1020 DATA 0000000001100000000001000100000000100001000000001110000000100100000000101000000
          0100100001000001000001001010000000000100100001
1030 DATA 0100000100100010010001001010000000001101001001000110000000010010110100010000011
          1000001010000100100101100111110100100010101100
1040 DATA 0000000100000000100000001100000011000100100100000010000000000000000011100000000000
          0000000000000100000010000111100000110010011010 0
1050 DATA 1010001110010010100111001101000111111101101110110100010101001100001110110000110 10
          0001101000000110100110111111100111111110101111 1
1060 DATA 0111100000000010000100100001010010001000100000000000010100000010101000010010000 0
          0010010100100000011100000000000100100000000011 10
1070 DATA 0110101011100000000011010100101000100100100000010111001000010001000100001001010 00
          0010110010100110001100000101101010100110010111 0
1080 DATA 0000000000100000010000000000000000100000001001000010000000000010000001100110010 01
          1100100011000111100001100100100011100011100 1000
1090 DATA 0011101010001101001000100100011000000100000000010000101010100111010100001011010 00
          0010000110110010010000101011010111000000001 110
1100 DATA 1011111110010011001110011101111111011101011110111101011111101101111100111011111110
          0001011101101111011110011111101111111101011111
1110 DATA 1010000101001010111100101100101001000101010110100110110010011001100110011111101001
          1110011011110110110101100111011000111000110 1110
1120 DATA 0100000000100100100001100010000000100111010000100001001000000101000000101000001000
          1110100010000100100101100011000000000001001000 10
1130 DATA 1010110111000011010101001111001001111111000001100011001111111000100010000001011001
          0111101001000011110011100110100100010110101 1100
1140 DATA 1101011100111111101110111101111100100011111111111101111000001111111111111110101110
          1100011111111111111110001100101111110101111 00011
1150 DATA 0001011100100011011000110100110111010101001000100001101001000011011000110101001 01
          0010010101101001001101001000011111000001 1000111
1160 DATA 1111101111110010000111011000111011001100110101010100001110111101010010100010 0010
          0001001101010010010010110001100011110100011 0011
1170 DATA 1000000001001100100001000011001000100010000010001110010100011000100011010010010 00
          1100100010000110110000000111000000101010010 1000
1180 DATA 0111111010100011111011101110110101011111101000111101001101001110111111010101011 11
          0011010100111001000111111111111101110101100 1111
1190 DATA 1000100101011100000100010001001011100000010111000001011101011000100000101010100 00
          1100101011000110111000000001100011101010111 0000
1200 DATA 0101001001000001000000101000010100001000000011011101011100110001000110000011100 00
          0100000110000000001110000111000001100001100 1010
1210 DATA 1010110111111111011111101011110101111111111111101101101111110111111111111111100 01111
          1111111001111111110111111111111111101111111111101
1220 DATA 0000100000000010001000001010000000101100000001100000000000000001000011000000000000
          0001100000000000000111011011100010110000000000 1
1230 DATA 1111111111111101111111111111111111101001111111111111111111111111111111011111111111
          1110111111111111110111111111111111111111111110
1240 DATA 1001110100001000110011010000110011000000000010000101110000000011010100000100100 01
          0000010000011100100000011011110100110101101010 1
1250 DATA 0100100101011010101100010000001011000000000010000000011000011001000010001000000000
          0100001101000000000010000100000000000001011000 00
1260 DATA 1111101110101111101000111111010111011111111111111101101011110111010101111011101110
          1011000110100111011111111111101101111110011001011
1270 DATA 0011011011111111111111101111111111011111111101111111101111111101111111111011111111
          1111010011101111111111111010100111110111101111 10
1280 DATA 1101100100000000000000010000010000000000000001000000010100000000100000000001000000000
          0000001100010000000000001011110000110000100000 1
1290 DATA 1001000101000000100100110001010000000100010001000011010000111100000000010011010000
          1101000011000100101010101101001000100000101011 0
1300 DATA 1111111111111111111111001111111111011111101110111101111111111011111111111110111111
          1110011101111111011111111101111111111111111111 11
1310 DATA 1011101010000011100010011111010000000110010011000100110110001110000000000011101110
          1011001110000101100110111111100000110100100111 1
1320 DATA 0100011101111111011101100101101111011001101100111011101111110101111111111001101 11
          0110010011111110011001011000011111101111111101
```

Table 1 Continued

```
2000 REM  Taxa names for NM$( )    updated 06/28/89
2010 DATA Actaea,Akebia,Amelanchier,Ampelopsis,Aralia,Arceuthobium
2020 DATA Arctostaphylos,Arisaema,Aronia,Asarum,Asimina,Asparagus,Atropa
2030 DATA Belamcanda,Berberis,Berchemia,Broussonetia,Buckleya,Bumelia,Calla
2040 DATA Callicarpa,Calycanthus,Calycocarpum,Caulophyllum,Celastrus,Celtis
2050 DATA Chaenomeles,Chenopodium,Chionanthus,Cissus,Clintonia,Cocculus
2060 DATA Convallaria,Cornus,Coryphantha,Cotinus,Cotoneaster,Crataegus,Cydonia
2070 DATA Daphne,Diospyros,Diphylleia,Dirca,Disporum,Duchesnia,Echinocystis
2080 DATA Elaeagnus,Empetrum,Epigaea,Euonymus,Ficus,Floerkea,Forestiera
2090 DATA Fragaria,Galium,Gaultheria,Gaylussacia,Geocaulon,Hedera,Hexastylis
2100 DATA Hydrastis,Ilex,Juglans,Juniperus,Leucophysalis,Ligustrum,Lindera
2110 DATA Lonicera,Lycium,Maclura,Maianthemum,Magnolia,Medeola,Melia,Melothria
2120 DATA Menispermum,Mitchella,Morus,Myrica,Nemopanthus,Nestronia,Nicandra
2130 DATA Nymphaea,Nyssa,Oplopanax,Opuntia,Osmanthus,Panax,Parthenocissus
2140 DATA Passiflora,Peltandra,Persea,Phellodendron,Phoradendron,Physalis
2150 DATA Phytolacca,Planera,Podophyllum,Polygonatum,Polygonum,Prunus
2160 DATA Pyracantha,Pyrularia,Pyrus,Rhamnus,Rhus,Ribes,Rosa,Rubus,Sambucus
2170 DATA Sapindus,Sassafras,Shepherdia,Smilacina,Smilax,Solanum,Sorbus
2180 DATA Streptopus,Symphoricarpos,Symplocarpus,Taxus,Toxicodendron,Trillium
2190 DATA Triosteum,Vaccinium,Viburnum,Vitis,Zanthoxylum
3000 REM  Character list    updated 04/08/89
3010 DATA  9, 2,"1 White or light gray"
3020 DATA 10, 2,"2 Brown or tan"
3030 DATA 11, 2,"3 Yellow"
3040 DATA  9,26,"4 Orange"
3050 DATA 10,26,"5 Red or pink"
3060 DATA 11,26,"6 Blue"
3070 DATA  9,42,"7 Purple"
3080 DATA 10,42,"8 Green"
3090 DATA 11,42,"9 Black"
3100 DATA  9,56,"10 Less than 1 cm long"
3110 DATA 10,56,"11 1-2 cm long"
3120 DATA 11,56,"12 More than 2 cm long"
3130 DATA 13, 1,"13 With floral remnants at apex"
3140 DATA 14, 1,"14 Without floral remnants at apex"
3150 DATA 13,45,"15 With 1 seed"
3160 DATA 14,45,"16 With 2-10 seeds"
3170 DATA 15,45,"17 With more than 10 seeds"
3180 DATA 17, 1,"18 Woody"
3190 DATA 18, 1,"19 Not woody"
3200 DATA 17,22,"20 Creeping or climbing"
3210 DATA 18,22,"21 Not creeping or climbing"
3220 DATA 17,57,"22 With spines"
3230 DATA 18,57,"23 Without spines"
3240 DATA 21, 1,"24 Opposite"
3250 DATA 22, 1,"25 Whorled or basal"
3260 DATA 23, 1,"26 Alternate"
3270 DATA 22,26,"27 Simple"
3280 DATA 23,26,"28 Compound"
3290 DATA 22,43,"29 Lobed"
3300 DATA 23,43,"30 Not lobed"
3310 DATA 22,61,"31 With teeth"
3320 DATA 23,61,"32 Without teeth"
3330 DATA  8, 4,"FRUITS"
3340 DATA 16, 4,"PLANTS"
3350 DATA 20, 4,"LEAVES"
```

APPENDIX 2.

Tabular Data for Random Access Keys

GENUS NUMBER		1234	5678	111 9012	1111 3456
FRUITS	1 White or light gray	1000	0100	0000	0000
	2 Brown or tan	0000	0000	0110	0000
	3 Yellow	0100	0001	0010	0010
	4 Orange	0000	0001	0000	0000
	5 Red or pink	1010	0011	1001	0010
	6 Blue	0111	1000	0000	0001
	7 Purple	0110	1010	1110	0000
	8 Green	0000	0000	0010	0000
	9 Black	0011	1010	1000	1101
	10 Less than 1 cm long	1011	1111	1001	0011
	11 1-2 cm long	1010	0001	0100	1010
	12 More than 2 cm long	0100	0000	0010	0100
	13 With floral remnants at apex	1010	1101	1100	0011
	14 Without floral remnants at apex	1101	0111	0011	1111
	15 With 1 seed	0001	0111	0010	0011
	16 With 2-10 seeds	1111	1011	1111	0010
	17 With more than 10 seeds	1000	0000	0100	1100
PLANTS	18 Woody	0111	1110	1010	0011
	19 Not Woody	1000	1001	0101	1100
	20 Creeping or climbing	0101	0010	0100	0001
	21 Not creeping or climbing	1010	1101	1111	1110
	22 With spines	0000	1000	0000	0010
	23 Without spines	1111	1111	1111	1101
LEAVES	24 Opposite	1001	1101	0000	1000
	25 Whorled or basal	0100	1001	0101	1010
	26 Alternate	1111	1011	1010	1111
	27 Simple	0011	0110	1111	1111
	28 Compound	1101	1001	0000	0000
	29 Lobed	1001	0001	0100	0000
	30 Not lobed	1111	1111	1111	1111
	31 With teeth	1011	1010	1000	0011
	32 Without teeth	0100	0111	0111	1111

GENUS NUMBER		1112 7890	2222 1234	2222 5678	2333 9012
FRUITS	1 White or light gray	0000	0000	0000	0010
	2 Brown or tan	0000	0100	0100	0000
	3 Yellow	0100	0100	1010	0000
	4 Orange	1000	0000	1100	0000
	5 Red or pink	1001	1100	1101	0001
	6 Blue	0000	1001	0000	1010
	7 Purple	0000	1101	0100	1010
	8 Green	0100	0000	0000	0000
	9 Black	0010	0010	0100	0110
	10 Less than 1 cm long	0011	1001	1101	1111
	11 1-2 cm long	1111	0010	1100	1010
	12 More than 2 cm long	1000	0110	0010	0000
	13 With floral remnants at apex	0101	0100	1111	0010
	14 Without floral remnants at apex	1011	1011	1101	1111
	15 With 1 seed	0110	0011	0100	1101
	16 With 2-10 seeds	0001	1101	1000	1110
	17 With more than 10 seeds	1000	0100	0011	0010
PLANTS	18 Woody	1110	1110	1110	1101
	19 Not Woody	0001	0001	0001	0010
	20 Creeping or climbing	0000	0010	1000	0101
	21 Not creeping or climbing	1111	1101	0111	1010
	22 With spines	0010	0000	1010	0000
	23 Without spines	1111	1111	1111	1111
LEAVES	24 Opposite	1100	1101	0000	1100
	25 Whorled or basal	1011	0001	0000	0010
	26 Alternate	1010	0011	1111	0101
	27 Simple	1111	1110	1111	1111
	28 Compound	0000	0001	0000	0100
	29 Lobed	1001	0011	0001	0100
	30 Not lobed	1111	1100	1111	1111
	31 With teeth	1000	1001	1111	0100
	32 Without teeth	0111	0110	0101	1011

GENUS NUMBER		3333 3456	3334 7890	4444 1234	4444 5678
FRUITS	1 White or light gray	0100	0000	0000	0011
	2 Brown or tan	0001	0000	1000	0000
	3 Yellow	0000	0110	1001	0010
	4 Orange	1100	0100	1001	0000
	5 Red or pink	1111	1101	1011	1011
	6 Blue	0100	0100	0100	0000
	7 Purple	0010	0100	1000	0001
	8 Green	0010	0000	0010	0100
	9 Black	0000	0100	0000	0001
	10 Less than 1 cm long	1101	1101	0111	1011
	11 1-2 cm long	0100	0101	0101	1010
	12 More than 2 cm long	0010	0110	1000	0100
	13 With floral remnants at apex	0111	1111	0000	0110
	14 Without floral remnants at apex	1001	0001	1111	1111
	15 With 1 seed	1101	0101	0010	0010
	16 With 2-10 seeds	1100	1100	1101	0101
	17 With more than 10 seeds	0010	0010	0000	1000
PLANTS	18 Woody	0101	1111	1010	0011
	19 Not Woody	1110	0000	0101	1100
	20 Creeping or climbing	0000	1000	0000	1101
	21 Not creeping or climbing	1111	1111	1111	1011
	22 With spines	0010	1100	0000	0110
	23 Without spines	1101	0011	1111	1111
LEAVES	24 Opposite	1100	0000	0000	1000
	25 Whorled or basal	1100	0000	0000	1000
	26 Alternate	1101	1111	1111	1111
	27 Simple	1101	1111	1111	0111
	28 Compound	0000	0000	0000	1000
	29 Lobed	0000	0100	0100	0100
	30 Not lobed	1101	1111	1011	1011
	31 With teeth	0000	0110	0100	1100
	32 Without teeth	1101	1001	1011	0011

GENUS NUMBER		4555 9012	5555 3456	5556 7890	6666 1234
FRUITS	1 White or light gray	1000	0001	0000	0001
	2 Brown or tan	0111	0000	0001	0010
	3 Yellow	0011	0000	0000	0100
	4 Orange	0100	0000	0000	0000
	5 Red or pink	0100	0101	0100	1100
	6 Blue	0000	0010	1000	0001
	7 Purple	0111	0010	0001	0001
	8 Green	0010	0000	0000	0010
	9 Black	0000	1010	1010	0111
	10 Less than 1 cm long	1101	0111	1110	1101
	11 1-2 cm long	0110	1100	1001	1001
	12 More than 2 cm long	0010	0100	0000	1010
	13 With floral remnants at apex	0011	0011	1111	0001
	14 Without floral remnants at apex	1101	1110	0000	1111
	15 With 1 seed	0001	1010	0100	0011
	16 With 2-10 seeds	0100	0011	1011	1101
	17 With more than 10 seeds	1110	0101	0001	1000
PLANTS	18 Woody	1110	1001	1010	0111
	19 Not Woody	0001	0111	0101	1000
	20 Creeping or climbing	1101	0111	0011	0001
	21 Not creeping or climbing	0110	1111	1101	1111
	22 With spines	0000	0000	0000	0001
	23 Without spines	1111	1111	1111	1111
LEAVES	24 Opposite	0101	1100	0000	0011
	25 Whorled or basal	0000	0110	0001	1001
	26 Alternate	1011	0101	1110	1110
	27 Simple	1111	1011	1111	1101
	28 Compound	0001	0100	0000	0010
	29 Lobed	0011	0100	0011	1100
	30 Not lobed	1101	1111	1111	0111
	31 With teeth	0100	1101	1000	1110
	32 Without teeth	1011	1011	1111	0101

GENUS NUMBER		6666 5678	6777 9012	7777 3456	7778 7890
FRUITS	1 White or light gray	0000	0000	0000	1110
	2 Brown or tan	0000	0001	0100	0000
	3 Yellow	1011	0100	0100	0001
	4 Orange	0001	1100	0000	0000
	5 Red or pink	0011	1011	0000	1101
	6 Blue	0101	0000	1001	0000
	7 Purple	0001	0000	1001	0100
	8 Green	0000	0110	0110	0100
	9 Black	0101	0000	1011	0100
	10 Less than 1 cm long	1111	0011	1011	1111
	11 1-2 cm long	1001	1001	1111	0100
	12 More than 2 cm long	0000	0101	0000	0100
	13 With floral remnants at apex	0001	0000	0010	1100
	14 Without floral remnants at apex	1111	1111	1101	0111
	15 With 1 seed	0110	0011	0101	0010
	16 With 2-10 seeds	0101	0010	1000	1001
	17 With more than 10 seeds	1000	1101	0010	0100
PLANTS	18 Woody	0111	1101	0101	0111
	19 Not Woody	1000	0010	1010	1000
	20 Creeping or climbing	0001	1000	0011	1000
	21 Not creeping or climbing	1111	1111	1100	0111
	22 With spines	0000	1100	0000	0000
	23 Without spines	1111	1011	1111	1111
LEAVES	24 Opposite	0101	0000	0100	1000
	25 Whorled or basal	0000	1000	1000	0000
	26 Alternate	1010	1111	0111	0111
	27 Simple	1111	1111	1011	1111
	28 Compound	0000	0000	0100	0000
	29 Lobed	0000	0001	0011	0100
	30 Not lobed	1111	1111	1101	1111
	31 With teeth	0000	0000	0111	0111
	32 Without teeth	1111	1111	1001	1011

GENUS NUMBER		8888 1234	8888 5678	8999 9012	9999 3456
FRUITS	1 White or light gray	0000	0000	0000	0100
	2 Brown or tan	0010	0100	0010	0000
	3 Yellow	1100	0001	0100	0010
	4 Orange	0000	0000	0000	0010
	5 Red or pink	0000	1101	0000	0011
	6 Blue	0001	0010	1001	0000
	7 Purple	0001	0110	0101	0011
	8 Green	1110	0100	0110	0011
	9 Black	0001	0000	1101	1001
	10 Less than 1 cm long	0000	1011	1011	0111
	11 1-2 cm long	1111	0011	0111	1011
	12 More than 2 cm long	0111	0100	0100	0010
	13 With floral remnants at apex	1011	1101	0010	0001
	14 Without floral remnants at apex	0110	0011	1111	1111
	15 With 1 seed	1001	0010	1011	0100
	16 With 2-10 seeds	0000	1001	1010	1001
	17 With more than 10 seeds	0110	0100	0100	0011
PLANTS	18 Woody	1001	1010	1001	1100
	19 Not Woody	0110	0101	0110	0011
	20 Creeping or climbing	0010	0000	1100	0000
	21 Not creeping or climbing	1111	1111	0011	1111
	22 With spines	0000	1100	0000	0000
	23 Without spines	1111	0111	1111	1111
LEAVES	24 Opposite	1000	0010	0000	1110
	25 Whorled or basal	0010	0001	1010	0000
	26 Alternate	0101	1000	1101	0011
	27 Simple	1111	1010	0111	0111
	28 Compound	0000	0001	1000	1000
	29 Lobed	0110	1000	0110	0010
	30 Not lobed	1111	0011	1011	1111
	31 With teeth	0101	1001	1100	0010
	32 Without teeth	1011	0010	0111	1111

GENUS NUMBER		1	1111	1111	1111
		9990	0000	0000	0111
		7890	1234	5678	9012
FRUITS	1 White or light gray	0100	0000	0000	0100
	2 Brown or tan	1000	0010	0101	0000
	3 Yellow	0100	1011	0011	1110
	4 Orange	0000	0100	0011	1100
	5 Red or pink	0100	1101	1111	1100
	6 Blue	0011	1000	0000	0001
	7 Purple	0001	1000	0010	1101
	8 Green	1100	0011	0010	0100
	9 Black	0010	1000	1010	1101
	10 Less than 1 cm long	1011	1100	1111	1101
	11 1-2 cm long	0110	1011	0011	1011
	12 More than 2 cm long	0100	1011	0001	1000
	13 With floral remnants at apex	1110	0111	0011	0100
	14 Without floral remnants at apex	1111	1000	1100	1011
	15 With 1 seed	1001	1010	0100	0011
	16 With 2-10 seeds	0010	0101	1000	1100
	17 With more than 10 seeds	0110	0000	0011	1000
PLANTS	18 Woody	1000	1111	1111	1111
	19 Not Woody	0111	0000	0000	1100
	20 Creeping or climbing	0001	1100	0011	1000
	21 Not creeping or climbing	1110	1111	1111	1111
	22 With spines	0001	1101	1011	1000
	23 Without spines	1110	1111	1111	1111
LEAVES	24 Opposite	0100	0000	1101	1110
	25 Whorled or basal	0000	0100	0010	0000
	26 Alternate	1011	1111	1111	1011
	27 Simple	1111	1111	1010	1001
	28 Compound	0000	0000	0101	1110
	29 Lobed	0101	0101	0110	1001
	30 Not lobed	1011	1111	1101	1111
	31 With teeth	1100	1101	1111	1100
	32 Without teeth	0011	0010	1100	0011

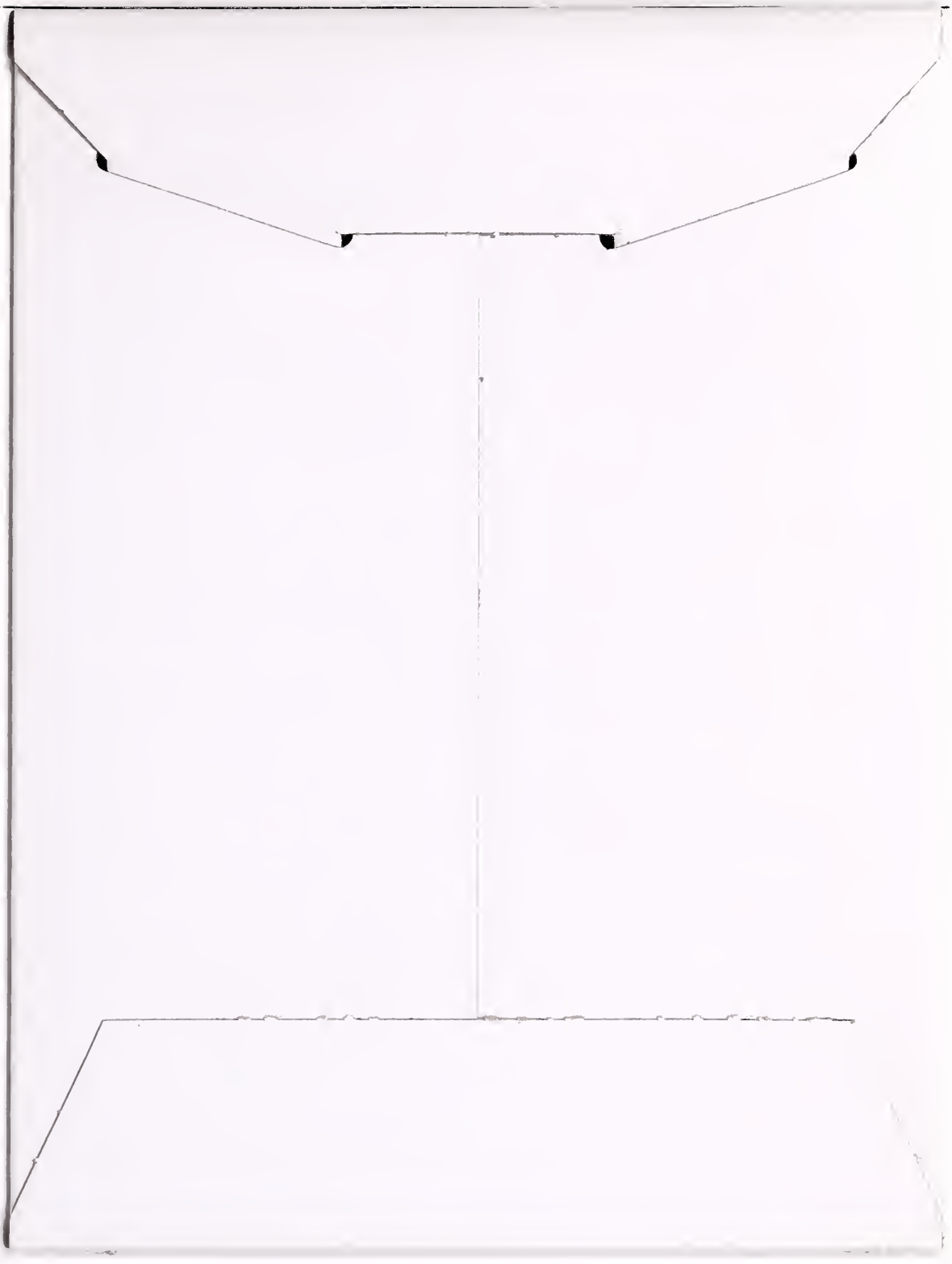
GENUS NUMBER		1111 1111 3456	1111 1112 7890	1111 2222 1234	1111 2222 5678
FRUITS	1 White or light gray	0000	0010	0110	0000
	2 Brown or tan	0000	0001	0010	0001
	3 Yellow	1001	0001	0101	1100
	4 Orange	0001	1001	0011	0100
	5 Red or pink	1111	1110	1011	1111
	6 Blue	0010	0000	0000	1110
	7 Purple	0101	0011	0010	1110
	8 Green	0111	0001	1100	1000
	9 Black	0111	0000	0000	1110
	10 Less than 1 cm long	1111	1110	1101	1111
	11 1-2 cm long	0001	1100	0110	1110
	12 More than 2 cm long	0000	0001	0010	0010
	13 With floral remnants at apex	1000	1011	0101	1100
	14 Without floral remnants at apex	1111	0101	1110	0011
	15 With 1 seed	1110	0000	1100	0111
	16 With 2-10 seeds	0111	1010	0011	0011
	17 With more than 10 seeds	0001	0101	0010	1000
PLANTS	18 Woody	1011	1010	1100	1111
	19 Not Woody	0111	0101	0111	0000
	20 Creeping or climbing	0011	0000	1100	1010
	21 Not creeping or climbing	1101	1111	1111	1101
	22 With spines	1011	0000	0000	0001
	23 Without spines	1111	1111	1111	1110
LEAVES	24 Opposite	1001	1010	1101	0101
	25 Whorled or basal	0000	0001	0110	0000
	26 Alternate	0111	1100	1100	1011
	27 Simple	1111	0111	1011	1110
	28 Compound	0001	1000	0100	0001
	29 Lobed	0001	0000	0101	0110
	30 Not lobed	1111	1111	1111	1111
	31 With teeth	0001	1010	0100	1111
	32 Without teeth	1111	0111	1111	1101

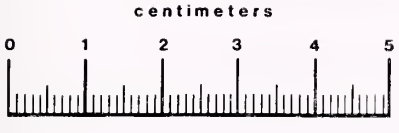
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128		

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128		

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128		

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128		





ISSN 0278-3355
ISBN 1-55554-188-3

89-7338
89-520